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ABSTRACT

Collected are 31 articles on public school educational activities for the trainable mentally handicapped or the severely emotionally disturbed student in the areas of academic skills, home living skills, and prevocational training. Most of the papers are said to have been written by classroom teachers. Three articles present an overview which includes a discussion of behavioristic task analysis. Fourteen articles consider techniques of teaching academic skills and include skills such as basic spelling, reading a menu, time telling, and arithmetic computation. The teaching of home living skills is examined in eight articles and includes skills such as using a kitchen stove, preparing toast, using a cooking oven, and reading a basic grocery list. The final section, consisting of six papers, on prevocational training considers topics such as the use of fund raising materials to teach prevocational skills to retarded students and the teaching of retarded students to package golf tees in the absence of customary production supports. (DB)

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Toward the Development and Implementation of an Empirically Based Public School Program for Trainable Mentally Retarded and Severely Emotionally Disturbed Students

Part II

EC 051 029E

Madison Public Schools
Department of Specialized
Educational Services
Bill K. Tilley, Ph.D., Director
June, 1972

Editors:
Lou Brown, Ph.D.
Ed Sontag, Ed.D.

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Part II

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Madison Public Schools
Department of Specialized Educational Services
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Introduction

In the summer of 1970, the Madison District of Vocational Rehabilitation provided funds so that persons from the Madison Public Schools, the University of Wisconsin, Department of Studies in Behavioral Disabilities and Division of Vocational Rehabilitation, could plan, organize and implement a public school prevocational training program. These funds provided those concerned with the Badger school program the opportunity to expend the time and energy, not available during the school year, necessary to arrive at program objectives. Funds for activities during the 1970-71 school year were received under a Vocational Education grant. The major activities of the initial year's funding consisted of the development of functional vocational skills, functional home living skills, functional academic skills, leisure skills, and appropriate social skills. A report on the first year's activities is contained in the publication, The Development and Implementation of a Public School Pre-Vocational Training Program for Trainable Retarded and Severely Emotionally Disturbed Students - Part I (Brown, Bellamy, and Sontag, 1971).

The second year of activities, to which this report addresses itself, has been concerned with the improvement and expansion of those areas delineated during the initial year of funding.

This compilation of programs and papers represents the collective efforts of many persons involved in the Badger School Program, an educational program primarily designed to serve trainable level retarded and severely emotionally disturbed students. The primary purpose of the Badger School Program is to offer the best instructional services possible to the students enrolled. There are, however, at least two additional peripheral purposes that should be delineated here: A) the Program is intimately involved with the University of Wisconsin Department of Studies in Behavioral Disabilities in an endeavor to select and train potential teachers of severely handicapped students, and B) the Program is deeply committed to a continuing search and assessment of new and improved methods of teaching severely handicapped students.

The Badger School Program is fundamentally experimental in that there is so little that has been proven instructionally effective with severely handicapped students. In the past the responsibility for instructional experimentation has been considered the responsibility of administrators, researchers, university personnel, etc. The Badger staff, of course, advocates that teachers should also be innovative, creative, systematic and empirically oriented. Thus, most of the papers in this volume were written by classroom teachers with the active and intensive assistance of potential teachers.

Ultimately, it may be possible to provide the educational community with a detailed, relevant, efficient and functional curriculum guide for use with severely handicapped students. That is, it may be possible to delineate sequences of what (content) how (methods) and the materials required to teach in such a way as to develop in these students the behavioral repertoires that would allow them to function independently in a community setting. However, it is the considered opinion of the Badger Program staff that the dearth of knowledge confronting the professional community at this point in time would make attempts at developing anything but the most general curriculum guide premature at best.

On the other hand, it does seem that in the past few years, both at Badger school as well as in other parts of the country, progress has been made toward developing belated but much needed information that can be used to teach developmental skills to trainable mentally retarded and severely emotionally disturbed students.

Thus, this manuscript should be construed as a collection of programs and papers rather than a curriculum guide. The rationale being that if we can develop, over a period of time, an instructional model and a sufficient amount of programs and content that empirically verify the substance of the model, we will someday be able to compile what is typically construed as curricula materials.

Hopefully, the material that follows might provide helpful interim information until sustained effort and cooperation result in what we are all searching for: an empirically valid instructional program that will maximize the educational potential of severely handicapped students.

There are at least three additional points that should be delineated to the reader. First, many of the programs reported here will be revised and submitted to various professional journals. Second, the programs described here should not be construed in any way as research, but only as an attempt to develop an empirically based instructional system. Third, the programs reported here are only samples of the programs completed at Badger school this past year.

The extent of the cooperation and mutual benefits resulting from this cooperative service and training program are reasonably unique in the professional community. The editors of this document, on behalf of the Badger staff, would like to express their sincere appreciation to those whose efforts have aided the development of the program at Badger school and the publication of this document.

Dr. Douglas Ritchie, Superintendent of the Madison Public Schools, Dr. Jean McGrew, Assistant Superintendent of the Madison Public Schools; Dr. Bill Tilley, Director of Specialized Educational Services; and Mr. Ed Colbert, Coordinator of Vocational Education, provided unusual administrative support from the Madison Public Schools central administration.

In addition, we are indebted to Mr. Rodney Van Deventer, District Administrator of the Madison District Office, Division of Vocational Rehabilitation, for his continued intensive support for the prevocational and vocational activities at Badger. Sincere appreciation is also expressed to Mr. John Melcher, Assistant Superintendent, Division for Handicapped Children; Mr. Ruel Falk, Director of the Bureau for Career and Manpower Development; and Mr. Pat Pflieger, Special Education Supervisor, all of the State of Wisconsin Department of Public Instruction.

Funding for the activities described in this manuscript was provided primarily from Vocational Education Grant #2-2080-S904 administered by the Bureau for Career and Manpower Development, Department of Public Instruction. Additional activities of this project were supported in part by NICHD Grant #5-P01-HD-03352-02 to the University of Wisconsin Center on Mental Retardation, and Grant OEG-0-71-1654-603 Project 591264 from the U.S. Office of Education, Bureau of Education for the Handicapped. Obviously, consistent financial support for the ongoing activities at Badger school has been received from the Madison Public Schools.

Finally, this publication is dedicated to the children and parents of Badger school who have again offered us a challenge to understand, learn, enjoy, and hope.

E.S.
L.B.

The information that follows was taken from the first part of a chapter written by Dr. Lou Brown for a book entitled, Review of Special Education. This book is edited by Dr. Lester Mann and Dr. David Sabitino, and it will be published in the Fall of 1972 by Buttonwood Farms Inc., Philadelphia, Pennsylvania.

The material presented here is an approximation of the material to be presented in the chapter. Dr. Lester Mann graciously has given his permission for part of the chapter to be included in this text. The reader interested in securing the edited version of the material presented here as well as the remaining portion of the chapter and the appropriate references is encouraged to secure a copy of the primary source from Buttonwood Farms Incorporated, 3515 Woodhaven Road, Philadelphia, Pennsylvania 19154.

The primary purpose of presenting the material here is to provide the reader with a brief overview of the status of public school programs for trainable level students and to provide an introduction to the instructional model used by the teachers to generate much of the information contained in the text.

INSTRUCTIONAL PROGRAMS FOR TRAINABLE LEVEL RETARDED STUDENTS[1]

Lou Brown

University of Wisconsin[2]

Scope of the Chapter

This chapter represents an attempt to present an instructional model that is applicable for use with trainable level retarded students. Several assumptions underlying the model and the technology it demands are offered. Hopefully, the model and the technology will be considered for use as tools by others concerned with teaching trainable level retarded students.

A comprehensive review of literature and programs concerning trainable level retarded students is not intended and space demands do not permit as detailed an analysis of certain topics as would be desirable. The works of others are presented to elucidate and contrast different points of view and to attempt to show that a technology for instructing these students is emerging.

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[1] This chapter will be published in, Mann, L. and Sabitino, D. (Eds.) Review of Special Education, Philadelphia, Penn.: Buttonwood Farms, 1972.

[2] The writing of this chapter was supported in part by NICHD Grant 5 P01 HD 03352-02 to the University of Wisconsin Center on Mental Retardation.

PART I

The Students

Dunn (1972) presents arguments why students who were formerly ascribed such labels as aments, idiots, imbeciles, trainable and severely retarded should now be labeled students with *moderate and severe general learning disabilities*. Kirk (1972) in a recent revision of his survey text retains the use of the label *trainable mentally retarded*. Rosenzweig and Long (1960) use the label *dependent retarded child*. Stephens (1971) has chosen to refer to the same level student as *developmentally young*. Bradley, Hundziak and Patterson (1971) use the labels *moderately and severely retarded* as does the American Association on Mental Deficiency (Heber, 1961). More extensive discussion of presumed correlates of such labels as MA, IQ, estimates of mental growth, comparison with other levels of retardation, learning characteristics, and organic impairments can be found elsewhere (e.g., Dunn, 1972; Kirk, 1972; Stephens, 1971; Goldberg and Rooke, 1967).

There can be little doubt that in the next few years these labels will, like their predecessors, acquire aversive properties and new labels will be generated. The real question is whether or not the students will change. Grouping and labeling students may be important for a variety of reasons: research, fund raising, regulating and administering school programs, etc. However, unless grouping and labeling contribute to a change in the functioning level of the students, grouping and labeling have little instructional relevance.

On the other hand it is possible that a label or an assumption might change the manner in which people at least temporarily view and react to one another. With this in mind an attempt is made here to change, in some small way, the orientation many people have toward students who have been labeled moderately and severely retarded, imbeciles, trainables, etc. This attempt is centered around the locus of the problem. Historically, the locus of the problem has been placed within the student. That is, it is the student who has a severe general learning disability; it is the student that is only trainable, it is the student that is an imbecile, severely retarded, etc. Recently, many persons (e.g., Lindsley, 1964; Bijou, 1966) have questioned continued placement of the locus of the problem inside the student and have emphasized experiential and environmental considerations as alternatives. This change in focus is endorsed here primarily because there is little teachers can do about such factors as defective genes, brain damage, or biochemical malfunctioning. There is much that can be done, however, if we attempt to treat environmental factors that teachers have control over as independent variables. Hopefully, the systematic manipulation of environmental variables will assist in the development of an instructional technology that is effective in teaching these students to engage in response patterns and life styles that have in the past been unavailable to them.

If the locus of the problem is changed from inside to outside the student, then "students who present teachers with severe instructional problems" or some similar statement might be considered an alternate to those labels listed above. However, since the last thing special education needs is another euphemism, the writer requests that the reader abolish the "stimulus trace" of the previous sentence. Since most special educators call those students "trainable" who do not "make it" in classes for "educable" students, the label trainable level retarded will be used here (reluctantly).

Labels notwithstanding, the important point to be realized is that there are many developmentally crucial skills that can be taught to these students, if we consider the instructional problem ours rather than theirs.

Historical Note

Historically, parents of trainable level retarded children attempted to provide instruction for them by either placing them in public or private residential facilities or tutoring them at home. In the late 1940's and the early 1950's many parents rejected these as the only two alternatives and worked for community based instructional programs. The National Association of Retarded Children (NARC) was organized and served as the primary force behind the demand for, and realization of, community based programs.

The development of these programs seems to have passed through three, not necessarily distinct, phases. First, parents struggled for places to put their children during the day. Private facilities were constructed, school basements and boiler rooms were adapted, and Sunday School rooms in churches were utilized. Second, the local facilities parents secured were staffed initially by volunteers, retired school teachers and parents themselves. Subsequently, the parents sought specially trained and certified teachers to staff their hard earned facilities in the hope that such teachers could generate the necessary behavioral development. Third, parents struggled for effective and relevant instructional programming. In short, they wanted quality education for their children.

There are still many communities in this country with no local physical facilities for trainable students. There are communities in this country which have arranged for facilities in which to place these children, but which do not have certified personnel. And there are communities in this country that have facilities and certified personnel, but do not have effective and relevant instructional programs.

Securing physical facilities and certified teachers are for the most part a function of economics and thus in our society should be relatively easy. Local and federal financial support can be obtained in many ways (tax grants, tuition, United Givers, etc.) and a facility can be constructed or adapted. State and federal priorities can be established and funded so that teacher training programs at colleges and universities can generate certified teachers in a relatively brief period of time. However, providing trainable level retarded students with quality education is another matter. At this point, no amount of money will provide these students with the skills they are capable of acquiring. The professional community does not now have the instructional technology necessary to teach these students what they need to know and what they are capable of learning.

In the late 1940's and early 1950's few trainable level retarded students in the United States were receiving instructional services from public schools. Although public school programs for such students had been initiated in St. Louis in 1929 and in New York City in 1934, few general educators at the time would have considered the suggestion that the public schools have a responsibility to these students even rational. In the early 1970's virtually every state in the nation adopted some community provision for services to trainable level retarded students. According to a report by the President's Committee on Mental Retardation (1967) the number of public school classes for trainable level retarded students rose from approximately 2,500 in 1963 to approximately 8,500 by 1967.

It can be assumed that within the next five to ten years public school programs for trainable level retarded students will be in existence in almost every school district in the U.S., primarily because there will be:

1) continued pressure by the NARC and its local affiliates on legislative bodies and local school boards;

2) litigation and judicial interpretations that make education the legal right of all children in the United States;

3) a shift in federal funding priorities to more severely and multiply handicapped children;

4) a lack of space in, expense of, and the growing intolerance for large multiple failure residential institutions.

When these classes are established it is quite doubtful that such circumscribed instructional objectives as Personal Safety, Personal Control, and Self Amusement will be adequate (Goldberg and Rooke, 1967). If a trainable level retarded student is to be placed in public school programs for 15 years (Age 5-20) it is extremely doubtful that such programs can be justified, if at the end of such a time period all that can be expected is for him to be maintained at home or placed in a traditional residential facility.

Whether or not trainable level retarded students should or should not be enrolled in public school programs (Goldberg and Cruickshank, 1958) or should or should not be placed in residential institutions, is no longer the question. These students will be enrolled in public school programs, and in adulthood, will remain in the community. Special Education is now faced with a new challenge: What are the ultimate objectives of school programs for trainable level retarded students and how do we approximate their realization?

Longitudinal Objectives of Instructional Programs

The primary longitudinal objectives of instructional programs for trainable level retarded students should be to teach as many skills as are necessary for the students to function adequately in a community setting. The curriculum of school programs must, therefore, provide for the development of such skills.

Merely delineating the behavioral repertoire necessary for adequate functioning in a community setting is so complex and so arbitrary a task that in all probability it could never be considered complete. Even more formidable is the task of teaching this behavioral repertoire to students exhibiting low acquisition rates, stimulus and response generalization problems, interpersonal difficulties, sensory anomalies, etc. Unfortunately, the developmental and learning difficulties of trainable level retarded students have frustrated many of the best intentioned teachers to the point that they gave up and distributed pot holders. This initial fatalism can be overcome, however, when one experiences Christmas In Purgatory (Blatt & Kaplan, 1967) visits or reads a newspaper exposé of several of our large multiple purpose residential facilities, talks to a parent of a 35 year old mongoloid, or plays with a group of warm, happy, loving multiply handicapped pre-schoolers. It then becomes easier to appreciate the importance and humaneness of developing adequate community living skills.

The teachers' contribution to the development of the necessary skills will emanate from the instructional programs to which the students are exposed during their school years. Because the instructional programs to which trainable level retarded students are exposed will become increasingly important in the next few years, a few words concerning such programs seem warranted.

Any instructional program contains at least three major components: What to teach (content or objectives); What instructional aids to use (materials); and How to teach (instructional technology).[3] The major emphasis of school programs in the past has been placed on what to attempt to teach. For example, Lance (1971) stated, "Methodology and materials however important they are to a successful program, are secondary to the establishment of realistic objectives."

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[3] Instructional materials, instructional objectives and instructional technology were artificially trichotomized in order to focus attention on instructional technology.

In the view of the writer a realistic objective is an objective that is realized. Assume that a teacher decides that her students should be able to label the printed words on the back of a box containing a cake mix (objective or content) and then she assembles all the instructional aids necessary to develop the behaviors of concern (materials). Assume further that the students do not acquire the behaviors necessary to make a cake. Since the objective was not realized it was unrealistic.

What usually happens subsequent to the preceding situation is that the teacher selects objectives that require less complex behavioral repertoires such as making pot holders, brushing teeth, or folding napkins, until she arrives at a task that the students can perform successfully. By this process an objective becomes realistic by default.

Certainly the scope and sequence of the instructional objectives presented to trainable level retarded students are crucial to their development and in no sense does the writer intend to minimize their importance. However, the purpose here is to attempt to emphasize the importance of, and the necessity for, an improved instructional technology. As teachers we could specify our objectives *ad infinitum*, secure the most advanced and sophisticated materials and still fail to teach the students. Why? In the view of the writer, we do not know *how* to teach the students to perform the responses necessary to attain the objectives or to emit the responses required by the materials.

Instructional Model: Behavioristic Task Analysis

A model, as the term is used here, is an abstract conceptualization of assumptions and principles that serve as *a priori* foundations of an instructional system. When a teacher is confronted with students she brings such a model to the instructional situation. This model is often ill-defined and contains many nebulous assumptions concerning the use of materials, rules of learning, and tactics of teaching. But it does contain preliminary conceptualizations that have a direct bearing on the organization of, and the activities conducted within the classroom.

A model is valid or invalid depending upon whether or not the implementation of the model solves the problem for which the model was generated. For example, assume a model airplane is generated and then a full scale airplane is built based upon the dictates of the model. If the plane flies effectively, the model was valid. If the plane does not fly, then either the model was invalid or it was not properly implemented. If the plane does not fly, we are left with at least three alternatives: reject the model in toto, make revisions in the model that seem logical, or retrace our implementation strategies. Two points should be noted. First, all models involve a priori assumptions, biases, hopes, etc. Second, the validity of a model when applied to a practical problem can only be established empirically.

The instructional model presented here and recommended for teachers of trainable level retarded students is referred to as behavioristic task analysis (Brown, Bellamy and Sontag, 1971). Task analysis typically refers to dividing complex instructional objectives into a sequence of less complex components. Behavioristic task analysis demands the additional requirements that each component be defined in terms of observable motor responses to specified stimuli, and that a series of instructional tactics that are designed to teach the student the behavioral components of the sequence be applied systematically.

Principles of task analysis have been applied in educational programs for centuries. Indeed, deciding upon what responses to teach a student and dividing the criterion response into a series of component responses is probably the least difficult demand of the model. Curriculum guides, textbooks, and related literature concerning trainable level retarded students are characterized by their relatively detailed descriptions of the components of instructional tasks (e.g., Buddenhagen, 1971; D'Amelio, 1971; Frankel, Happ and Smith, 1966; Kolburne, 1965; Molloy, 1963; Rosenzweig and Long, 1960). The difficulty arises, however, when one attempts to teach the students to perform the responses in the series. Again, what to teach is only one of our problems. How to teach is our primary problem.

Instructional Assumptions

There are at least three crucial instructional assumptions that seem particularly applicable to teachers of trainable level retarded students: instructional environmentalism, instructional determinism, and instructional empiricism. All three of these assumptions have been delineated before by various educators, philosophers and psychologists. They are presented and described here in an attempt to focus attention on instructional variables the teacher can manipulate.

Instructional Environmentalism

For centuries persons have engaged in sometimes lengthy, sometimes esoteric, sometimes valuable and sometimes bigoted debates about the differential contributions of biological and environmental variables to the development of human behavior. Persons often adopted extreme positions that took the form of attributing all behavior to either nature or nurture. Most people now realize the differential and interactive effects of both. Indeed, most persons now realize that even such a dichotomized conceptualization (nature-nurture) is quite artificial.

The purpose here is not to argue the relative effects of either heredity or environment, but only to emphasize environment. In a classroom for trainable level retarded students a teacher is quite likely to encounter students who have many manifestations of genetic anomalies, obvious neurological and orthopedic impairments, degenerative diseases, or vision, hearing and speech difficulties. Confronted with such obvious indices of organic malstructure and function, it is often quite tempting to attribute instructional failure to biological factors. In fact, however, the failure of the student to acquire certain skills may not be due to biological factors, but rather due to the teachers failure to attempt manipulations that neutralize or circumvent what have been perceived as instructional impediments.

The assumption of instructional environmentalism recognizes the potential effects of biological factors on a student's functioning, but recognizes also that a teacher can do little, if anything, about such factors. What a teacher can do is manipulate the instructional environment (factors that are outside of the student's body) and assess the effectiveness of her manipulations on the behavioral development of the student.

Instructional Determinism

It is the rare teacher who would even suggest that students should have the same behavioral repertoire in June that they had the previous September. Most teachers assume that students acquire behaviors, skills, information, etc., during the academic year because of manipulations made by the teacher during that year. Indeed, if a student does not develop behaviorally over the academic year due to the instruction provided by the teacher, then many human and economic resources will have been wasted. Most students in public schools acquire behaviors incidentally, vicariously, observationally, from casual personal interactions, from television, etc. Trainable level retarded students have substantial difficulty acquiring much needed behaviors incidentally, vicariously, observationally, etc. Thus, the teacher of trainable level retarded students, because she cannot rely on her students acquiring much needed behaviors indirectly or outside of class, must take more of an active role in deciding the specific behaviors her students should acquire.

One way to focus the responsibility of student development on the instructional program is for the teacher to make the assumption of instructional determinism. Admittedly, a teacher arrives at instructional objectives in cooperation with the school board, administrative superiors, parents, etc. Ultimately, however, the final responsibility for the crystalizing of the objectives lies with the teacher. What the teacher is saying when she somewhat arbitrarily specifies a behavioral objective for her class is "I have decided that my students will acquire these behaviors, and I am going to do A, B & C in an attempt to teach them." She then arranges the classroom environment so as to maximize the probability that these behaviors will occur. In effect, she determines what behaviors she wants to occur and what manipulations will be made to develop those behaviors. If the behaviors she specifies do, in fact, occur because of her environmental manipulations, her instructional program was successful. If the behaviors do not occur, her instructional program was unsuccessful.

If a teacher makes the assumption of instructional determinism, then by definition, she assumes the responsibility for the behavioral development of the students. If this behavioral development does not occur, it is more probable that the teacher would attribute the lack of development to her instructional program rather than to factors outside her domain (uncooperative parents, brain damage, genes, etc.).

Instructional Empiricism

A third crucial assumption suggested for teachers of trainable level retarded students is that of instructional empiricism. When a teacher makes the assumption of instructional empiricism she in effect is saying, "As a result of my instruction, the students will change in a manner that I can sense" (i.e., measure, detect, see, verify). This assumption places a tremendous amount of responsibility upon the teacher in that she cannot claim that showing, telling, explaining, modeling, presenting, etc., are instruction. She can claim instruction only when there has been a demonstrated development in the behavioral repertoire of the student. Showing, telling, etc. may or may not effect change in the student. The teacher who makes the assumption of instructional empiricism is in a much better position to evaluate her effectiveness because she continually makes attempts to measure student development.

Thus, if a teacher makes the three preceding assumptions she is in effect saying, "I will teach my students to make these responses. My technology of teaching will be based on manipulating environmental variables and I will measure the observable responses of the students in an attempt to discern whether or not my technology allowed me to generate the responses of concern."

Parenthetically, it should be noted that it is becoming quite popular to say to a teacher, "If the student fails, you have failed." With many student failures this may, in fact, be true. With trainable level retarded students, however, it must be realized that the technology for effecting substantial development is emerging but currently unavailable to most teachers (Gold, 1972). Criticizing a teacher for not applying a technology that is available and effective is one thing; criticizing a teacher for not developing students when the technology is currently inaccessible is something else.

Direct vs. Inferential Measurement

Much, if not most, educational measurement is based on assumptions of inferential statistics. Because of the difficulty, expense, time and energy needed to measure every response a teacher has to develop, educators have turned toward obtaining measures of samples of behavior that are assumed to be representative of the population of behaviors in the students' repertoires. For example, if a teacher wishes to measure whether or not her students can add any two numbers that total 10, instead of measuring a response to every permutation, she typically selects a sample set of problems from the population of problems. If a student responds correctly to the sample problems, then the teacher often infers that the student can respond correctly to other problems requiring the same operations. Similar examples of inferential measurement can be found in almost every content area.

Inferential measurement is an extremely questionable measurement strategy when one is concerned with measuring the effects of instruction on the behavioral development of trainable level retarded students. If a trainable level retarded student can solve the problems 2 + 5 = ___; 6 + 4 = ___ or verbally label the words "mother" and "dog", a teacher cannot infer that the same student can solve the problems 6 + 1 = ___; 8 + 2 = ___ or verbally label the words "father" and "cat". If a teacher is interested in whether or not a trainable mentally retarded student can make a particular response, she has to directly measure that response, i.e., the teacher must have empirical verification of the existence of the behaviors of concern.

Direct measurement is particularly crucial in attempts to teach tasks that are cumulative. If the correct performance of the responses in component C of a task are dependent upon the correct performance of the responses in components A and B, then the teacher must guarantee that A and B responses are in the behavioral repertoire of the student before she even considers progression to component C. Since most developmental skills are in many ways cumulative (math, reading, language, speech, practical arts) teachers of trainable level retarded students must be prepared to spend relatively long periods of time and considerable effort developing basic behavioral repertoires.

Few, if any, teachers have the time, resources or inclination to directly measure each response each student makes in each instructional setting. Therefore, the teacher must decide which behaviors are so important to the development of the student that she should expend the time and energy in order to verify their existence. Very little attention is given in this chapter to specific direct measurement techniques that have practical value for classroom teachers. However, most of the instructional programs in Part II involve the use of such techniques and the reader is referred to the primary sources.

Essential Components of Behavioristic Task Analysis

Many of the components of behavioristic task analysis presented below have been delineated elsewhere (e.g., Mager, 1962). However, one rarely encounters such components in literature concerned with trainable level retarded students. The components described here are essentially those delineated by Brown, Bellamy and Sontag (1971). They considered the following as tentative basic components of behavioristic task analysis:

> "First, the teacher must specify terminal objectives in behavioristic terms. That is, she must convert the required criterion performance into observable responses.
>
> Second, the teacher must analyze the criterion responses and divide them into a series of less complex responses.
>
> Third, the teacher must arrange the responses she decides are necessary for completion of the terminal response into a series.
>
> Fourth, the teacher must teach or verify the existence of the student's ability to perform each response in the series.
>
> Fifth, the teacher must teach the students to perform each response in the series in serial order.
>
> Sixth, in an attempt to delineate successes and failures, the teacher must record student performance during each training phase so that adjustments can be made during the teaching process." (Brown, Bellamy and Sontag, 1971, p. 3)

Each of the above six requirements should be met in each instructional program. However, they may not occur in the order listed above, or two or more requirements may be met simultaneously.

An Instructional Example Of Behavioristic Task Analysis

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Until a few years ago trainable level retarded students learned only at the hands of exceptionally skilled and innovative teachers. There was little, if any, technological information available to all teachers on how to teach specific skills to trainable retarded children. However, recent developments in the field have demonstrated that trainable level retarded students can learn many basic academic social and vocational skills.

In the past few years an instructional model, behavioristic task analysis, has been described and defined (Brown, Bellamy and Sontag, 1971). This model suggests a means of breaking down teaching skills, tasks, and behavioral objectives into a sequence of less complex components.

The six components of behavioristic task analysis are:

1. Specify a terminal objective
2. Determine less complex components of the objective
3. Arrange the less complex components in a series
4. Verify the student's ability to perform the components
5. Teach the components that the student cannot perform
6. Measure the students progress continuously

The instructional example to be adapted to the behavioristic task analysis model is that of teaching three students four geometric shapes. The purpose of this paper is to demonstrate, through an instructional example, behavioristic task analysis.

This program was supported in part by funds granted to the Madison Public Schools by the State of Wisconsin, Department of Vocational Education and in part by NICHD Grant 5 P01 HD 03352 to the University of Wisconsin Center on Mental Retardation.

The first component listed above states that from the intent of teaching geometric shapes one must come up with a terminal objective. The terminal objective must be specific, behavioral, and measurable. The phrase, to teach three students geometric shapes, says nothing about what the learner will be doing when he knows geometric shapes. The following statement is, however, a terminal objective:

> When the student completes the program of instruction, he will be able to identify by name each of four plane geometric shapes, i.e. a square, circle, rectangle, and triangle.

The above statement contains the essential words-to identify by name-required to arrive at a behavioral objective. A verbal response is specific, behavioristic, and measurable.

The second component states that the task of verbally identifying four geometric shapes must be broken down into less complex responses. Any task can be subdivided and arranged along dimensions of difficulty. For example, in subdividing the task of labeling shapes along the dimension of response difficulty, one might arrive at the following:

A) Verbally labeling four plane shapes

B) Pointing to four plane shapes after the teacher labels them

C) Matching two sets of four plane geometric shapes

Another alternative is subdividing the task of labeling shapes into the number of cues inherent in the stimulus. The breakdown here might be:

A) Verbally labeling four plane shapes

B) Pointing to four plane shapes after the teacher labels them

C) Matching two sets of four plane shapes

D) Verbally labeling four solid flannel shapes

E) Pointing to four solid flannel shapes after the teacher labels them

F) Matching two sets of solid flannel shapes

G) Verbally labeling four flat 3-D shaped

H) Pointing to four flat 3-D shapes after the teacher labels them

I) Matching two sets of flat 3-D shapes

How a task is subdivided, of course, depends solely on the needs of the target students. In the interest of simplicity this paper will consider only the first set of components listed above (A, B, & C).

The third component states that the three responses, labeling, pointing to, and matching, must be ordered by difficulty. From easiest to most difficult, the components would be sequenced as follows:

A) Matching two sets of plane geometric shapes

B) Pointing to the shape which is indicated by the teacher

C) Labeling by name the four plane geometric shapes

The rationale for the above order is that seeing shape, as indicated by a matching response, is a prerequisite of the other two steps. The receptive skill of recognizing shapes, as indicated by a pointing response, is easier then verbalizing shapes. The expressive skill of verbalizing, as indicated by the labeling response, is the most difficult.

The fourth component in behavioristic task analysis states that the students' ability to match, to point to, and to label geometric shapes must be verified. Verification is carried out through a baseline. A baseline is essentially an inventory of current functioning on the task of concern. It tells the teacher whether the students can or cannot label, point to, and match shapes. Prior to baselining, the teacher designs a sheet on which to record student responses, i.e. a data sheet. A data sheet for three students on three tasks might look as follows:

Matching Shapes
Baseline

	TRIAL ONE				
S_1					
S_2					
S_3					
	TRIAL TWO				
S_1					
S_2					
S_3					
	TRIAL THREE				
S_1					
S_2					
S_3					

Pointing Shapes
Baseline

	TRIAL ONE				
S_1					
S_2					
S_3					
	TRIAL TWO				
S_1					
S_2					
S_3					
	TRIAL THREE				
S_1					
S_2					
S_3					

Labeling Shapes
Baseline

	TRIAL ONE				
S_1					
S_2					
S_3					
	TRIAL TWO				
S_1					
S_2					
S_3					
	TRIAL THREE				
S_1					
S_2					
S_3					

During baseline the following set of events occur:

A) The teacher places one set of shapes on the table, hands the second set to the student, and says, "Put the two which look the same next to each other."

B) The student responds.

C) The teacher says nothing but records the students successes and/or failures on the data sheet.

The above procedure is repeated three times each with all three students.

Next the teacher baselines the students ability to point to the appropriate shape.

A) The teacher places the four shapes on the table in front of the student and says, "Point to the ______."

B) The student responds.

C) The teacher says nothing but records the student's responses on the data sheet.

The above procedure is repeated for all four shapes until each student has had three chances to demonstrate competency.

Finally the teacher baselines labeling shapes.

A) The teacher holds the shape up in front of student and says, "What is this?"

B) The student responds.

C) The teacher says nothing but records the student's responses on the data sheet.

The above procedure is repeated with all four shapes until each student has had three chances to demonstrate competency.

The fifth component states that the instructor must teach the student to match, to point, and to label geometric shapes in that order. The instructional techniques to be used in teaching these three tasks are reinforcement and modeling.

First of all, at the beginning of each teaching trial, a reinforcement contingency is offered to the student. In teaching the three tasks, the contingencies are:

Matching - "If you put all the shapes that look the same next to each other, I will let you push the buzzer button."

Pointing - "If you point to the shape that I tell you to correctly, I will let you push the buzzer button."

Labeling - "If you tell me the name of the shape I hold up, I will let you push the buzzer button."

Secondly, before instruction begins and when the students make a mistake, the teacher shows them how (models) to do each task.

Thus during the teaching phase the following set of events occur:

A) The teacher places one set of shapes on the table, hands the second set to a student and says, "Put the two which look the same next to each other."

B) The student responds and the teacher records the response on a data sheet.

C) If the student is successful, the teacher hands the student the buzzer button and lets him push it.

D) If the student is unsuccessful, the teacher carries out the task as the student watches and then says, "Now you do it again." Then if successful the student is mildly reinforced.

Next the instructor teaches the students to point to the appropriate shapes:

A) The teacher places the four shapes on the table in front of the student and says, "Point to the ______."

B) The student responds and his response is recorded.

C) If the student is successful, the teacher hands him the buzzer button and lets him push it.

D) If the student is unsuccessful, the teacher points to the appropriate shape and says, "Now you point to the ______." Then if successful, the student is mildly reinforced.

The above procedure is repeated until each student has responded once to each shape.

Finally the instructor teaches the students to label shapes.

A) The teacher holds the shape up in front of the student and says, "What is this?"

B) The student responds and his response is recorded.

C) If the student is successful, the teacher hands him the buzzer button and lets him push it.

D) If the student is unsuccessful, the teacher says, "No, this is a ______. Now, what is it?" Then if the student successfully imitates, he is mildly reinforced.

The above procedure is repeated until each student responds correctly to each shape.

The sixth component states that during the teaching phase, the student's responses must be recorded continuously. To accomplish this end, the instructor has available data sheet. The data sheets look as follows:

Matching Shapes
Teaching Phase

	TRIAL FOUR				
S_1					
S_2					
S_3					
	TRIAL FIVE				
S_1					
S_2					
S_3					
	TRIAL SIX				
S_1					
S_2					
S_3					

Pointing Shapes
Teaching Phase

	TRIAL FOUR				
S_1					
S_2					
S_3					
	TRIAL FIVE				
S_1					
S_2					
S_3					
	TRIAL SIX				
S_1					
S_2					
S_3					

Labeling Shapes
Teaching Phase

	TRIAL FOUR				
S_1					
S_2					
S_3					
	TRIAL FIVE				
S_1					
S_2					
S_3					
	TRIAL SIX				
S_1					
S_2					
S_3					

Each time a student responds during the three steps, a demarcation of indicating correctness or incorrectness is made. Measurement continues until the students satisfy a predetermined level of performance. At that point, the terminal objective, that of labeling shapes, is realized.

Summary

Typically, special educators concerned with developing school programs for trainable mentally retarded students have looked to curriculum materials as a means by which these students can be taught skills. A major emphasis of public school programs has been the content (what to teach) areas of instructional programming. While the scope and sequence of instructional programming is of crucial importance, it is like the old adage of putting the cart before the horse if it precedes the development of instructional technology (how to teach).

Little attention has been given to establishing an empirical-based instructional technology. Development of a technology of how to teach trainable mentally retarded students is needed before or in conjunction with decisions as to what to teach. It is of little significance if the teacher decides that it is important for her students to know how to make a bed if she does not have the skills necessary to teach this important skill. The instructional model--behavioristic task analysis--is one means by which a teacher can begin to develop an instructional technology for teaching trainable level students.

Introduction

Academic Skills

The primary objective of the academic component of the Badger Program is to teach the students the reading, math, language, etc., skills necessary for independent community functioning. Obviously, the realization of such a lofty objective is, at this time, extremely remote. Nevertheless, it is the considered opinion of those involved in the Badger Program that the mere conceptualization of such an objective provides a valuable incentive for the creation of more effective teaching programs as well as a constant reminder of the effort and concern required.

Thus, the programs reported in this section are concerned with delineating instructional procedures that can be applied in an attempt to develop academic and pre-academic skills in trainable level retarded and severely emotionally disturbed students. It should be noted that the programs reported here are only examples of the many teaching programs designed and implemented at Badger school in the past year. Time does not permit the inclusion of all programs.

L.B.
E.S.

A Teaching Procedure To Develop Word Attack Skills: Toward The Development Of Reading And Spelling Skills In TMR Level Students

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For many students the development of phonics skills is extremely difficult. Most commercial phonics material presents phonetic rules and their exceptions in a few pages of a workbook. For most students such a brief exposure may suffice to provide a basic understanding of the phonics rules of concern. However, such a strategy is undoubtedly questionable when a teacher is concerned with teaching phonetic skills to low functioning students.

Recently, it has been demonstrated that many low functioning students can be taught a variety of basic reading skills (Brown, Bellamy, Bancroft, and Sontag, 1971; Brown and Hermanson, 1969; Brown, Klemme, and Haubrich, 1970; Brown and Perlmutter, 1970). However, teaching these skills involve the "whole word method." It is doubtful that the whole word method will be able to provide low functioning students with knowledge of all the words they need to know. Thus, however valuable the whole word method may be, it is most likely adjunctive rather than inclusive.

This program is an attempt to delineate a teaching procedure that can be used to develop basic phonetic skills in low functioning students. If it can be demonstrated that low functioning students can be taught phonetic skills, in addition to "whole word" reading skills, it may ultimately be possible to provide students with other skills necessary to read unfamiliar words and thus increase their chances of survival in a complex symbol based community setting.

Typically, rules related to vowels are the initial phonics skills taught. This approach presents some extremely difficult instructional problems to teachers of low functioning students who are attempting to maintain consistency in programs designed to develop phonics skills. Several difficulties encountered when attempting to initiate phonics programs with vowels are: A) vowel sounds vary with their placement in a word; B) there are a large number of exceptions to vowel rules; and C) oftentimes vowel sounds are "silent". Thus, it was decided that the teaching of vowel sounds would be held in abeyance until skills related to less complex consonant sounds were developed.

The program was divided into the following five tasks:

Task I	The students were taught to label consonant sounds.
Task II	The students were taught to articulate consonant blends.
Task III	The students were taught to write consonant blends from verbal cues of the teacher.
Task IV	The students were taught to delineate consonant sounds from words articulated by the teacher.

This program was supported in part by funds granted to the Madison Public Schools by the State of Wisconsin, Department of Vocational Education and in part by NICHD Grant 5 P01 HD 03352 to the University of Wisconsin Center on Mental Retardation.

Task V The students were taught to write a whole word in response to the verbal cue of the teacher.

METHOD

Students (Ss)

Three Ss participated in this program. They ranged in age from 12 to 14 years old, and in IQ scores from 45 to 55 (X=50). Reading ability (word recognition) was evaluated and found to range from 1.1 to 2.5. S's also had received such medical diagnoses as Down's Syndrome, severely emotionally disturbed, and brain damaged from birth.

Materials

1) 18 index cards with the consonants printed on them.

2) 30 index cards with a consonant blend printed on each.

3) Blank sheets of lined paper.

4) 5 worksheets, corresponding to the five blend sets. Each work sheet consists of six words, each word having a consonant blend omitted with blank spaces provided to fill in the appropriate blend (See Worksheets I-V).

5) 10 sets of 3" x 5" index cards, each set consisting of ten cards, each with one word printed on it.

6) Grid type data sheets for the recording of Ss' verbal and written responses.

7) Reinforcers consisted initially of coke and/or M&M's. During the program, poker chips (points) were substituted with no noticeable affect upon performance. Once per week Ss exchanged points earned (one point for each poker chip) for back-up reinforcers such as kites, magazines, records, toys, and games.

Teaching Procedures

Baseline. S's performance on all tasks was assessed prior to the onset of instruction. Two baseline trials were conducted in which each S responded to all instructional cues in each of the five tasks. Assessment was conducted in a group setting. T presented S with an instructional cue and allowed S to respond and did not provide indications of accuracy.

Teaching. Group organization, instructional cues and task requirements were the same during baseline measurement and teaching. During teaching, S's first response to the initial instructional cue was recorded; if correct it was followed by compliments from T paired intermittently with tangible reinforcers.

If S was incorrect, T modeled the appropriate response, repeated the instructional cue, and verbally praised S for a correct response. If S again responded incorrectly when the instructional cue was repeated, T modeled the correct response and praised S for an accurate imitation of this model.

Task - Descriptions

I - Labeling the sounds of eighteen consonants

Set I	Set II	Set III
b	j	r
c	k	s
d	l	t
f	m	v
g	n	w
h	o	z

II - Articulation of consonant blends

Set I	Set II	Set III	Set IV	Set V
st	sw	tr	bl	ch
sp	scr	cr	cl	sh
sh	squ	dr	fl	ng
sm	spr	pr	gl	th
sk	str	br	pl	wr
sc	st	thr	sl	tion

III - Writing the consonant blend from T's verbal cue.

IV - Writing the consonant blend omitted from a word (See Worksheets I-V).

V - Labeling word cards which include many consonant sounds (Words were selected from the Dolch list).

Set I	Set II	Set III	Set IV	Set V	Set VI	Set VII
a	funny	look	see	am	do	new
and	go	make	the	are	eat	no
away	help	me	three	at	four	now
big	here	my	two	ate	get	or
blue	I	not	up	be	good	our
can	in	one	we	black	have	out
come	is	play	where	brown	he	please
down	it	red	yellow	but	into	pretty
find	jump	run	all	came	like	ran
for	little	said	you	did	must	ride

Set VIII	Set IX	Set X
she	went	any
soon	what	as
that	white	ask
there	who	by
they	will	could

this
under
want
was
well
with
yet
after
again
an
every
fly
from
give
going

VII - Writing the words which include many consonant sounds (Words were selected from the Dolch list) - (Sets same as listed in Task VI).

Task Instruction

Task I - Labeling the sounds of eighteen consonants.

a) Instructional cue: For this task S was presented with an index card with the printed stimulus on it. The instructional cue was, "Make the sound of that letter."

b) Task requirement and measurement: S was required to respond to T's stimulus by verbalizing the sound of the letter printed on the index card. Only the initial response following the initial instructional cue was recorded as correct or incorrect.

c) Teaching Consequences: If S responded correctly after the initial instructional cue he earned praise and a poker chip as discussed in the preceding materials section. If S responded incorrectly, the procedure was the same as described in the teaching section.

Task II - Articulating consonant blends.

a) Instructional cue: For this task T presented an index card with consonant blend printed on it. The instructional cue was, "Make the sound of these letters."

b) Task requirement and measurement: S was required to respond to T's visual stimulus by verbalizing the sound of the consonant blend printed on the index card. Again, only the initial response following the initial instructional cue was recorded as correct or incorrect.

c) Teaching Consequences: Same as described in Task I.

Task III - Writing the consonant blends from T's verbal cue.

a) Instructional cue: S was required to respond to T's verbal stimulus by writing the consonant blend sound verbalized by T (i.e., for the blend "br", T's cue is "Write b-b-r-r). The instructional cue was "Write ________".

b) Task requirement and measurement: S was required to respond to T's verbal stimulus by writing the correct consonant blend. Measurement was the same as previously described.

c) Teaching Consequences: Same as described in Task I.

Task IV - Write the consonant blend omitted from a word (See Worksheets I-V).

a) Instructional cue: Each S is given a worksheet and instructed to write the omitted blend following T's instructional cue, "Write ________."

b) Task requirement and measurement: S was required to respond to T's verbal stimulus by writing in the consonant blend omitted from the printed word. Measurement was the same as previously described.

c) Teaching Consequences: Same as described in Task I.

Task V - Writing the words which include many consonant sounds.

a) Instructional cue: For this task T presented S with a verbal cue, "Write the word ________."

b) Task requirement and measurement: S was required to respond to T's stimulus by writing the word verbalized by T. Measurement was the same as previously described.

c) Teaching Consequences: Same as described in Task I.

RESULTS

In this program we have adapted the multiple baseline design developed by Risley and Baer (1971). A standard multiple baseline design employs continuous and simultaneous measurement of correct responses to all behavior under scrutiny, while one or more behaviors are subjected to the experimental variable (teaching in this instance). This program has instead continuously measured only one behavior at a time. Testing and teaching trials were alternated in a revised measurement design that allowed for the use of a larger percentage of classroom time for teaching.

As mentioned before, three Ss participated in this program. Graphs recording the number of correct responses for the three S's as a group, were kept. As a group, the S's could make from zero to eighteen correct responses on Figures I-V. On Figure V, the S's as a group could make from 0 to 30 responses. Criterion was defined as 2 consecutive perfect trials for each S's within the group.

Prior to the onset of instruction, all S's were given a pre-test designed to measure their ability to 1) verbally label the eighteen consonants used in Task I and 2) verbally label the ten sets of spelling words used in Task V. On both of these measures all S's performed at criterion level, consequently, it was not necessary to incorporate these steps into the teaching program as they were part of S's repertoire upon entering the program.

All S's taken as a group were able to correctly spell approximately 19% of the 100 words included in Task V (Figure V-B_1). This initial baseline of Task V was recorded prior to baseline of Task I. This initial baseline of Task V serves as a measure of spelling behavior prior to any instruction.

Next all S's were baselined on Task I, articulating the sounds of the eighteen consonants. As depicted in Figure I, none of the S's were able to perform this task under baseline conditions. However, all S's achieved criterion in twenty-three teaching trials (a teaching trial corresponds to approximately 20 minutes of instructional time and is represented by every data point on the graph). All S's maintained criterion in the post-test phase, under baseline conditions.

Figure II shows that none of the S's were able to verbalize the sounds of the thirty consonant blends (Task II) at baseline. However, they achieved criterion on Set I in ten trials, Set II in ten trials, Set III in nine trials, Set IV in six trials, and Set V in eleven trials. From these results, it appears that the learning of one set of blends did not reduce the number of trials necessary to learn successive sets. All sets required the same average number of trials necessary to achieve criterion (Same for Figures III, IV, and V). A post-test of all 5 sets showed that criterion was maintained across sets.

In Figure III (Task III), none of the S's were able to write the blends verbalized by T at baseline. All S's achieved criteria in forty-seven trials and maintained criteria on all five sets during the post-test.

Task IV (Figure IV) required that the S's be able to write in blends omitted from five sets of words. Evidently, the change in instructional format effected the S's ability to generalize from the individual writing of the blends to writing the blends within the context of the word, since none of the Ss were able to perform the task under baseline conditions. However, this task was learned in 29 teaching trials. In the post-test situation, under baseline conditions, all Ss maintained an average of 94.4% correct responding for the 30 blends included in the five sets of worksheets.

In Figure V (Task V-B_2), all Ss were again tested on the 100 spelling words, under baseline conditions. At this point the Ss averaged 60% correct spelling under baseline conditions, as opposed to 19% prior to the onset of any instruction in this program. This is an increase of 41% from B_1 to B_2 (Figure V).

At this point, the authors hypothesize that the acquisition of phonetic skills learned did affect the S's ability to decode and spell 100 words that they were able to recognize and verbally identify. However, outside factors, may have also contributed to this increased ability in spelling. Other programs outside the classroom, although not identical in objectives, may have affected the S's ability to decode and spell the words included in Task V. In any case, a post-test, under baseline conditions (Figure V-B_3), showed that all Ss were able to correctly spell all 100 words with an average of 98% accuracy. This was an increase of 79% from the pre-test prior to beginning the program to post-test upon completion of the program.

DISCUSSION

From the results of this program, it appears that phonics can be taught in a step-wise process towards the development of successful word attack skills. The objective of this program was the development of a more efficient method of articulating and spelling words. Prior to the onset of instruction the Ss were not able to spell as accurately as they showed upon completion of the program. From the results, it appears logical to assume that the intervening teaching did affect the S's ability to spell a set of one hundred words.

Considering the implications of this program in relation to the development of word attack and spelling skills, the question arises as to the efficacy of teaching word attack skills as a method of learning unfamiliar words, as opposed to the sight word approach. The phonetic approach assumes that a certain amount of generalization must occur for the student to take what he learns in one situation and apply it in a variety of situations where there are words to be decoded. If we were to rely on equiping the student with an adequate enough sight word vocabulary to deal with the numerous situations that require knowledge of unfamiliar words, the task would be enormous and require retention abilities far beyond those exhibited by this low functioning population to date. It appears logical then, that the probelm of word attack in reading unfamiliar words must be met by developing a skill that is usable across situations "with children who progress beyond sight vocabulary, the ... phonetic training should facilitate more advanced reading skills" (Sloane and MacAulay, 1968). If a student has a repertoire of basic sounds (i.e., consonant blends) to use in breaking down a word; he has a skill that is useful in many situations--providing the use of this skill can be generalized outside the classroom setting. Furthermore, if we are to address ourselves to the problem of teaching reading to low functioning students, in a broader sense than is offered by a sight word approach, then it is imperative that we develop skills in this direction.

As spoken language, auditory discrimination and word attack skills improve, children using a phonetic technique could be taught to discriminate their own productions when reading and writing and would no longer have to rely upon a sight vocabulary alone.

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FIGURE I - TASK I

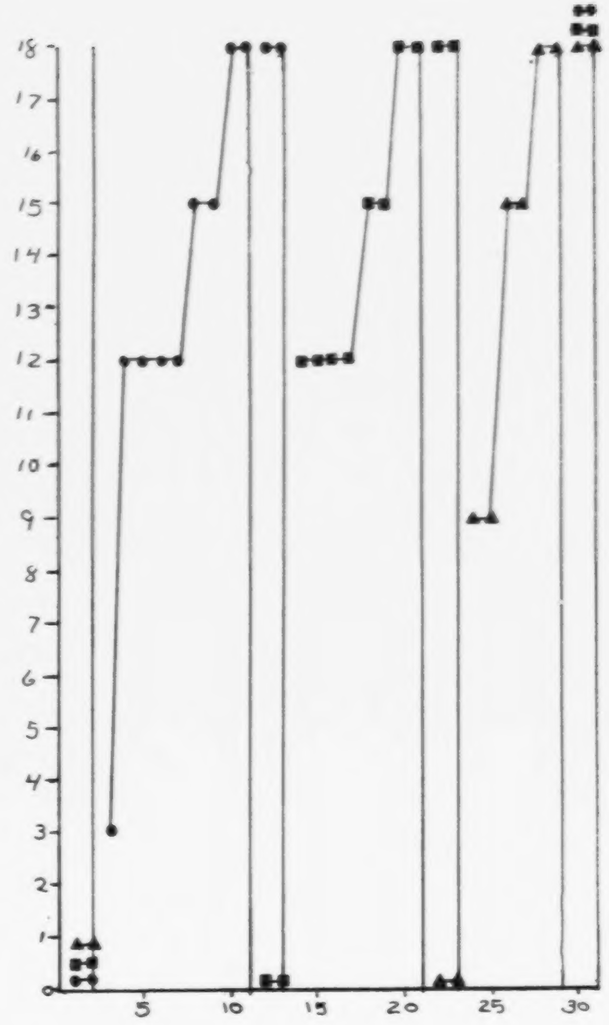


FIGURE II - TASK II

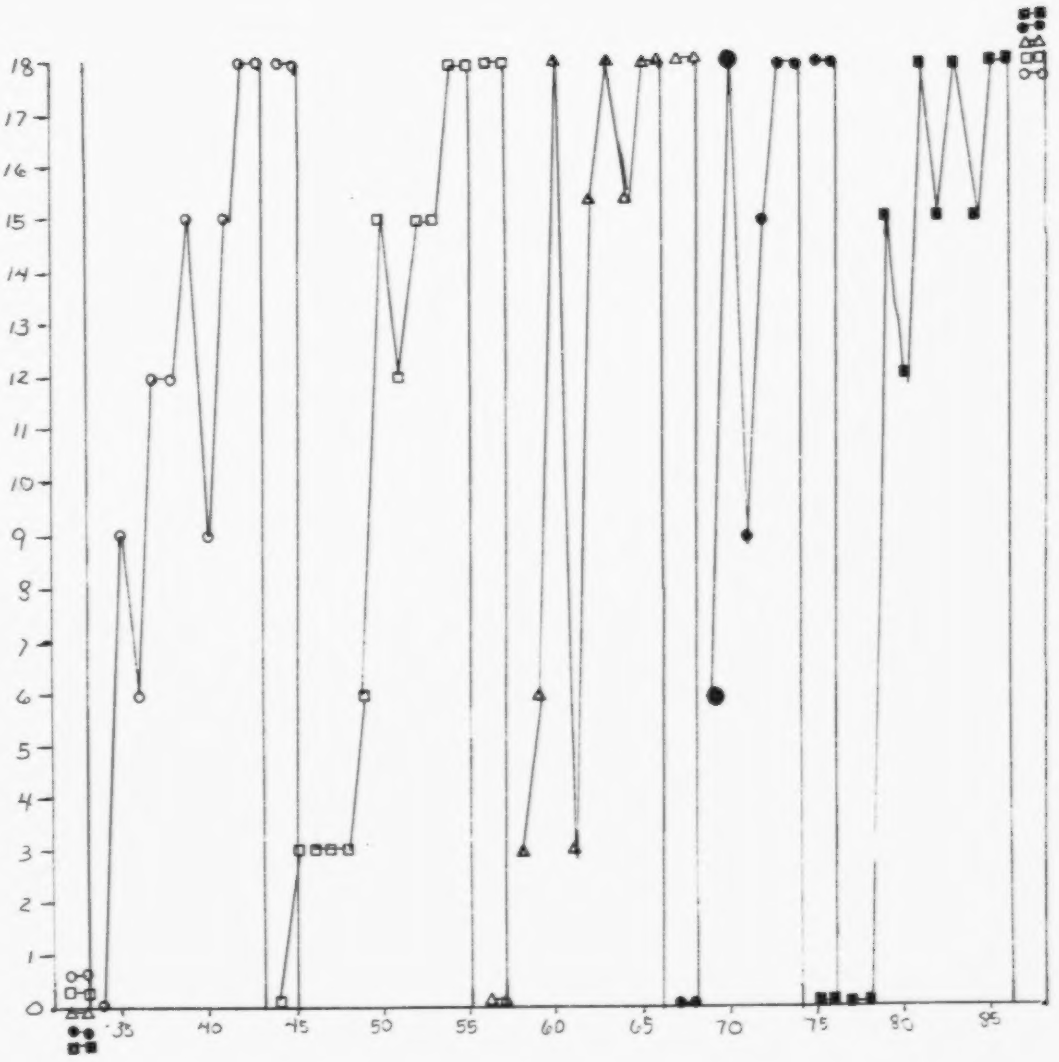


FIGURE III - TASK III

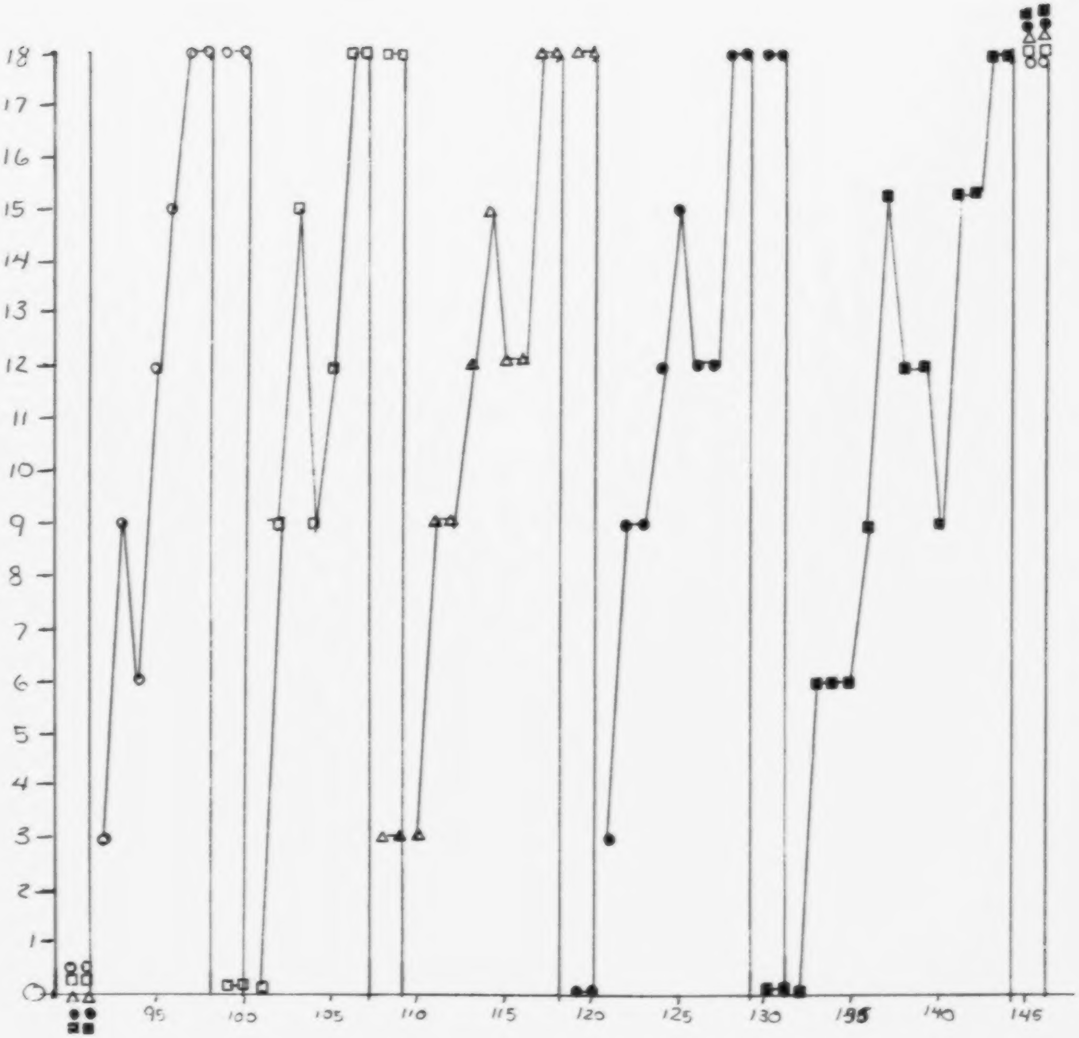


FIGURE IV - TASK IV

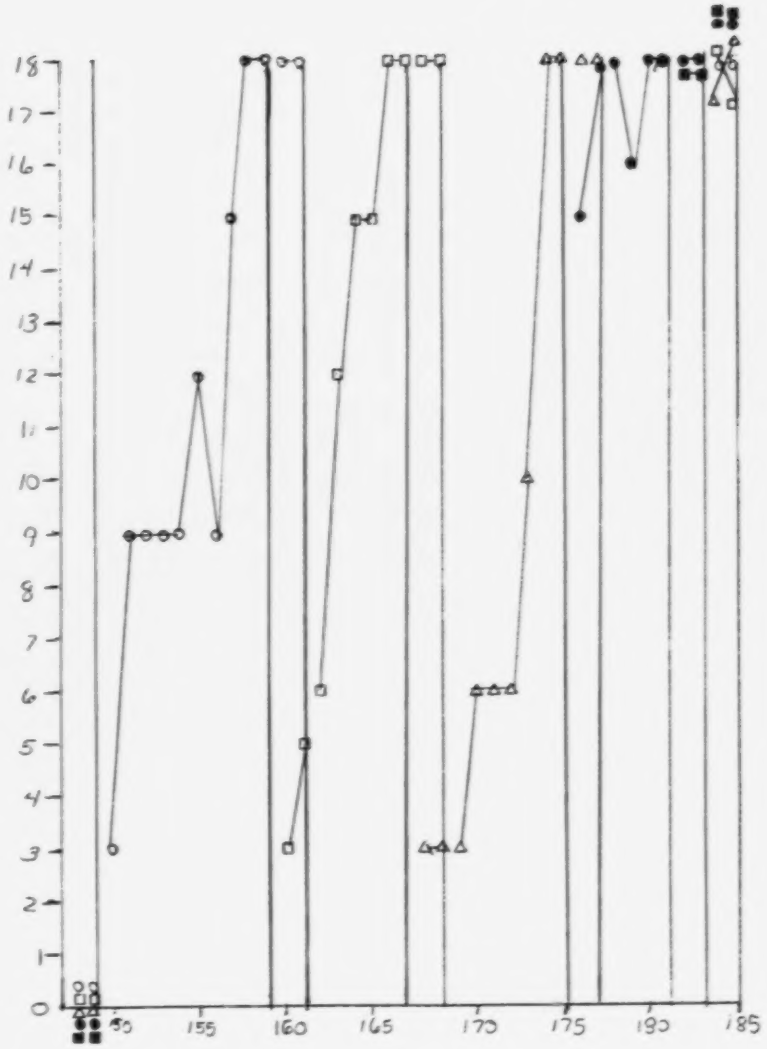
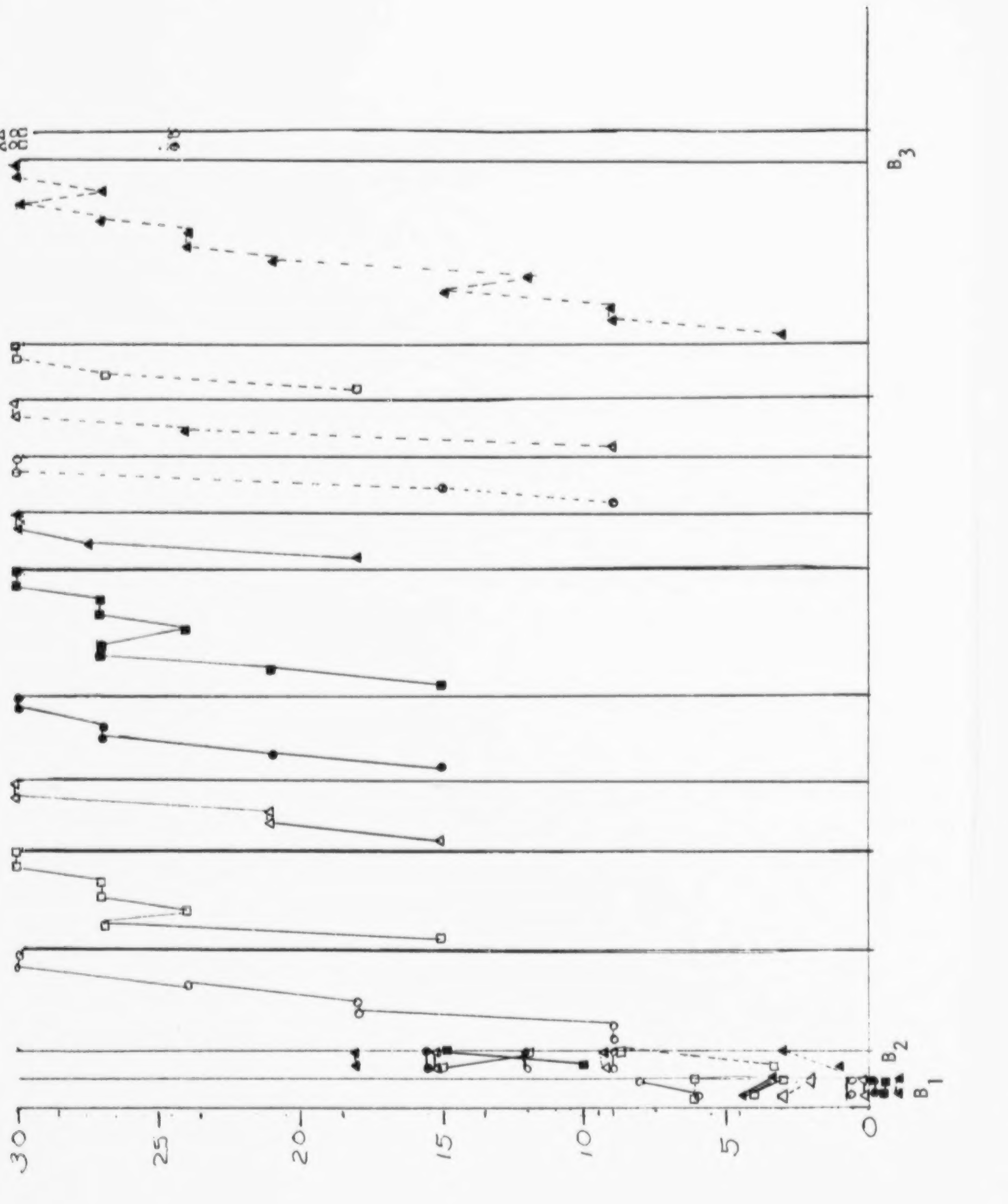


FIGURE V - TASK V



Worksheet I

My name is ____

The date is ____

Set I

1) ___ ___ ing (st)

2) ___ ___ in (sp)

3) ___ ___ ap (sn)

4) ___ ___ all (sm)

5) ___ ___ in (sk)

6) ___ ___ are (sc)

Worksheet II

My name is ____

The date is ____

Set II

1) ___ ___ op (st)

2) ___ ___ ing (sw)

3) ___ ___ ___ ing (spr)

4) ___ ___ ___ are (squ)

5) ___ ___ ___ ew (scr)

6) ___ ___ ___ ing (str)

Worksheet III

My name is ____

The date is ____

Set III

1) ___ ___ ip (tr)

2) ___ ___ y (cr)

3) ___ ___ ip (dr)

4) ___ ___ int (pr)

5) ___ ___ own (br)

6) ___ ___ ___ ow (thr)

Worksheet IV

My name is ____

The date is ____

Set IV

1) ____ ____ ue (bl)

2) ____ ____ ap (cl)

3) ____ ____ at (fl)

4) ____ ____ ad (gl)

5) ____ ____ ay (pl)

6) ____ ____ ip (sl)

Worksheet V

My name is ____

The date is ____

	Set V
1) ___ ___ at	(th)
2) ___ ___ in	(ch)
3) ___ ___ ip	(sh)
4) ___ ___ ite	(wr)
5) ac ___ ___ ___ ___	(tion)
6) si ___ ___	(ng)

Teaching Trainable Level Students Basic Spelling Skills

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Traditionally public school programs designed to serve the longitudinal needs of trainable level retarded students have deemphasized concerns related to developing basic academic skills (Dunn, 1963; Goldberg and Rooke, 1967; Kirk, 1972). Recently, however, it has been demonstrated that through the systematic application of basic learning and measurement tactics trainable level retarded students can be taught many basic academic skills in the general areas of math, language, reading (e.g., Bellamy and Laffin, 1972; Brown, Bellamy, Bancroft, and Sontag, 1972; Brown, Bellamy, Gadberry, and Sontag, 1971; Brown, Hermanson, Klemme, Haubrich, and Ora, 1970; Brown, Huppler, Pierce, Johnson, and Sontag, 1972; Brown, Huppler, Pierce, and Sontag, 1972; Brown and Klemme, 1971). If many of the academic skills currently being taught to trainable level students are to be functional (i.e., contributing toward their development as independent citizens) it is imperative that in addition to teaching reading and math etc., spelling and writing must also be taught. For example, with appropriate writing and spelling skills the students would be able to work independently in workbooks, leave messages to parents, and decode words not in their immediate sight vocabulary. Thus, this program is concerned with teaching trainable level students enrolled in a public school basic spelling skills.

When spelling is taught in most public schools some form of the assign-test method is typically utilized. The assign-test method often involves a teacher assigning students a list of words to learn to spell. The students then, on their own efforts, are expected to acquire the skills necessary to spell the

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words on a subsequent teacher administered test. The assign-test method assumes the existence of a behavioral repertoire composed of at least the following components:

A) the ability to drill oneself or obtain assistance from peers or parents.

B) the ability to learn the words in the drill setting and remember them until the time of the test.

C) a willingness on the part of the student to perform at his best on the test.

Axelrod, Whitaker and Hall report the promising use of the assign-test model with a group of four students labeled emotionally disturbed and learning disabled. In their program three words were assigned each day and tested the following day. During the testing phases social and later tangible reinforcement in the form of candy and toys were presented contingent upon successive increases in accuracy. However, even with the introduction of contingent tangible reinforcement the students still averaged only eight of twelve possible correct responses on the final criterion test.

While variations of the assign-test method may be appropriate for many students, it is probably inappropriate in many instructional settings where self-instruction is unfeasible, or where delayed memory skills are not well developed. Nevertheless, as spelling is a crucial academic skill it is imperative that special educators attempt to delineate procedures that can be used to teach all students such skills. The instructional literature reviewed, however, provides the teacher with few alternatives to the assign-test method.

The program described here was an attempt at providing the special education teacher of students with moderate and severe learning disabilities (trainable retarded, severely emotionally disturbed) with a programmatic alternative to the assign-test method of teaching spelling. This program was different from the assign-test model in that:

A) the words were learned in a formal instructional environment where drill was replaced by teacher modeling and student imitation.

B) acquisition and performance were accounted for in the instructional setting which initially reduced the dependency of performance on the students delayed memory skills.

C) incentives were programmed contingently and immediately in an attempt to maximize acquisition and performance.

The entire program was divided into the following parts.

I A one-one instructional arrangement was used to teach one student to spell five sets of eleven words.

II As one-one instructional settings are extremely difficult to arrange in public school classrooms, an instructional setting was arranged for group instruction.

III The group instructional procedure was adapted in an attempt to account for individual acquisition variations.

METHOD

Students (Ss)

$\underline{S}_1$ was an 11 year and 7 month old girl involved in a public school special education program for trainable retarded students. In the last few years, S has refused to respond to psychometrists in numerous test situations. Thus, no I.Q. score is available. S's school records contain such labels as cerebral palsy, aphasic, emotionally disturbed, and learning disabled. During the past three years teachers and other school personnel have described S as follows:

> "It is difficult to get her attention focused on a task, and even more difficult to hold it for more than a few minutes."..."She will follow directions only for a brief period."..."rarely sits down in class"... "a low level of attending behavior, no positive interaction with peers, very little communicative language usage."

$\underline{S}_2$, a 14 year 7 month old male, obtained a WISC Full Scale I.Q. score of less than 46. ($\underline{S}_2$ "scored too low for it to appear on the norms"). He was labelled moderately retarded which places him in the trainable category.

$\underline{S}_3$ was a 14 year 5 month old male, labelled severely emotionally disturbed and mildly retarded. He obtained a FSIQ score on the WISC of 69. On the WRAT he obtained a spelling grade equivalent of 1.5. During the past 3 years teachers and other school personnel have described $\underline{S}_3$'s behavior as follows:

> "($\underline{S}_3$) has stopped pretending to be severely retarded and has shown us that he can speak clearly."..."...Even though ($\underline{S}_3$) has shown progress since 1970, he is approximately at the first grade level in academic skills."

$\underline{S}_4$ was a 15 year 6 month old male diagnosed slightly above the trainable range. However, tested on the WISC he obtained a Full Scale I.Q. score of less than 46. $\underline{S}_4$ was transferred out of a class for slow learners "because he was not able to function academically anywhere near any of his classmates".

$\underline{S}_5$, a 19 year 3 month old male, obtained a WISC Full Scale I.Q. score of 49. He was labelled moderately retarded which places him in the trainable range.

Prior to the start of the program it was established that all 5 Ss could print the letters of the alphabet.

All five Ss were enrolled in special education classrooms for trainable level and severely emotionally disturbed students in the Madison, Wisconsin Public School System.

Materials and Instructional Arrangement

The following instructional materials were used in the program.

A) Data sheets were constructed which allowed for the continuous recording of all initial responses in each part of the program.

B) 8½" x 11" work sheets were constructed for use in each part of the program. These work sheets consisted of eleven lines above which the words to be spelled were to be written. The word sheets used in Part I contained eleven lines and the work sheets in Part II contained 6 lines.

C) In Part I edibles in the form of candy, soft drinks, cookies and crutons were used as contingent consequences. In Part II poker chips were used as contingent consequences. These chips could later be exchanged for items in the school store.

D) A total of 67 words were selected from the Sullivan Associates Programmed Reading Books I and II (Buchanan, 1969). In Part I a total of 55 different words were randomly assigned to the following 5 sets of 11 words each:

Set I: map, fish, pant, this, in, on, thin, man, sit, pin, I
Set II: am, bed, mat, that, egg, fits, hand, sand, rich, ham, sad
Set III: nap, fat, back, sitting, red, pan, cat, fast, ant, bit, pat
Set IV: an, if, brick, it, leg, tin, a, the, hit, at, can
Set V: I'm, hat, pen, hill, ship, dish, sing, bell, fell, tan, his

In Part II a total of 30 different words were randomly assigned to the following 5 sets of 6 words each:

Set VI: ant, tin, that, panting, hands, am
Set VII: cans, pans, map, patting, his, sat
Set VIII: mint, tan, this, singing, hits, fast
Set IX: dish, has, ship, pin, napping, cats
Set X: mat, thin, sitting, fishing, is, an

These words were printed on 5" x 7" blank index cards.

In Part I the teacher (T) and S_1 were seated around a table in a classroom. In Parts II and III, T and Ss 2, 3, 4, and 5 were seated around a table in a classroom.

General Program Design

The measurement design used to assess the effectiveness of the teaching procedures was a modification of a multiple baseline design (Risley and Baer, 1971). While standard multiple baseline designs require continuous measurement (testing) of the dependent variables of concern such requirements seem impractical in many instructional settings (Brown, Bellamy, Gadberry, 1971).

Part I was divided into the following 12 steps:

A) Test Sets I, II, III, IV, and V
B) Teach Set I
C) Test Sets I and II
D) Teach Set II
E) Test Sets I, II, and III
F) Teach Set III
G) Test Sets I, II, III, and IV
H) Teach Set IV
I) Test Sets I, II, III, IV, and V
J) Teach Set V
K) Test all sets
L) All sets were taught to a criterion of 2 consecutive errorless trials.

Parts II and III were divided into the following 13 steps:

A) Test Sets VI, VII, VIII, IX, and X
B) Teach Set VI
C) Test Sets VI and VII

D) Teach Set VII
E) Test Sets VII and VIII
F) Teach Set VIII
G) Test Sets VIII and IX
H) Teach Set IX
I) Test Sets IX and X
J) Teach Set X
K) Test Set X
L) Test all sets VI, VII, VIII, IX, and X
M) Reteach all sets to criterion of 2 consecutive errorless trials.

TEACHING PROCEDURES

Part I

Step I - Testing T presented a worksheet to S_1 and said, "write PAN" (to write meant to print the word on the worksheet provided). If S did not respond, or printed an incorrect response, an incorrect response was recorded on the data sheet. If S responded correctly a correct response was recorded on the data sheet. S_1 was praised verbally for responding regardless of whether her response was correct or incorrect. This procedure was followed until S_1 had the opportunity to respond to the 5 sets of 11 words on two consecutive occasions.

Step II - Teaching Set I The procedures used in Step I were also used in teaching except that the accuracy of the responses determined the subsequent events. The following procedures were followed:

A) If S_1 responded correctly, T made such statements as "Good spelling. That's the way to write ______. Good job." In addition, S_1 was given an edible.

B) If S_1 did not respond or made an incorrect response, T said, "No. That's not how to spell PAN. Look." T placed the word card in front of S_1 and said, "This is how to spell pan.....Spell pan." (To "spell" meant to verbally call out each letter in the word in correct sequence.) While S_1 spelled the word, T placed a finger on the appropriate letters.

  aa) Following a correct response, T praised S_1. T then removed the word card from sight and instructed S_1 to spell pan without written cues.

    aaa) Following a correct response, T praised S_1 and instructed S_1 to turn her worksheet facing down and write pan.

      aaaa. Following a correct response, T praised S_1 with such statements as, "That's how to write pan. Good spelling!"

bbbb. Following an incorrect response, *T* said, "No! Look." *T* presented the word card to S_1 and said, "This word is pan P-A-N. You spell it after me." As *T* called out each letter, S_1 was required to imitate on two consecutive occasions.

bbb) Following an incorrect response to spelling the word without a word card presented procedure B was repeated.

bb) Following an incorrect response to spelling the word upon being shown the word card, procedure bbbb was followed.

This procedure was followed until S_1 wrote the 11 words in Set I correctly in response to the verbal cues of *T* on her worksheet on three consecutive occasions.

Step III S_1 was tested on her ability to write the words in Sets I and II using the same procedures as described in Step I.

Step IV The procedures used to teach S_1 to write the words in Set I were used to teach the words in Set II.

Step V The procedures described in Step I were used to test *S*'s ability to write the words in Sets I, II, and III.

Step VI The procedures used to teach the words in Sets I and II were used to teach the words in Set III.

Step VII The procedures described in Step I were used to test *S*'s ability to write the words in Sets I, II, III, and IV.

Step VIII The procedures used to teach the words in Sets I, II, III were used to teach the words in Set IV.

Step IX The procedures described in Step I were used to test *S*'s ability to write the words in Sets I, II, III, IV, and V.

Step X The procedures used to teach the words in Sets I through IV were used to teach the words in Set V.

Step XI The procedures described in Step I were used to test *S*'s ability to write the words in Sets I through V.

Step XII The procedures described in Step II were used to reteach Sets I through V to a criterion of two consecutive errorless trials.

Part II - Teaching

Step I The procedures used to test the ability of S_1 to write the words in Sets I through V were used to test the ability of *S*s 2, 3, 4, and 5 to write the words in Sets VI through X with the exception that the opportunity to respond was rotated.

Step II The procedures used to teach the words in Set II to $\underline{S}_1$ were used to teach the words in Set VI to $\underline{S}$s 2, 3, and 4 with the following exceptions:

A) The teaching procedures were used to teach the first word in Set VI to $\underline{S}_2$, the second word in Set VI to $\underline{S}_3$, the third word in Set VI to $\underline{S}_4$, the fourth word in Set VI to $\underline{S}_5$, the fifth word in Set VI to $\underline{S}_2$, etc.

B) When $\underline{S}$ 2, 3, 4, or 5 either spelled or wrote a word correctly, $\underline{T}$ presented the word card to the group, and instructed the group to spell the word aloud in unison.

C) Tokens rather than edibles were dispensed contingent upon initial correct responding.

These procedures were followed until $\underline{S}$s 2, 3, and 4 correctly wrote all words in Set VI on three consecutive occasions.

Step III The procedures described in Step I were used to test the ability of $\underline{S}$s 2, 3, and 4 to write the words in Sets VI and VII.

Step IV The procedures described in Step II were used to teach $\underline{S}$s 2, 3, and 4 to write the words in Set VII.

Step V The procedures described in Step I were used to test the ability of $\underline{S}$s 2, 3, and 4 to write the words in Sets VII and VIII.

Step VI The procedures described in Step II were used to teach $\underline{S}$s 2, 3, and 4 to write the words in Set VIII.

Step VII The procedures described in Step I were used to test the ability of $\underline{S}$s 2, 3, and 4 to write the words in Sets VIII and IX.

Step VIII The procedures described in Step II were used to teach $\underline{S}$s 2, 3, and 4 to write the words in Set IX.

Step IX The procedures described in Step I were used to test the ability of $\underline{S}$s 2, 3, and 4 to write the words in Sets IX and X.

Step X The procedures described in Step II were used to teach $\underline{S}$s 2, 3, and 4 to write the words in Set X.

Step XI The procedures described in Step I were used to test the ability of $\underline{S}$s 2, 3, and 4 to write the words in Sets II through X.

Step XII The procedures described in Step II were used to reteach $\underline{S}$s 2, 3, and 4 to write the words in Sets VI through X to a criterion of 2 consecutive errorless trials.

Part III - Teaching

In Part II, Steps I and II, the performance of $\underline{S}_5$ suggested that he would not progress through Sets VI through X as rapidly as $\underline{S}$s 2, 3, and 4. Thus, rather than providing a large number of criterion trials for Ss 2, 3, and 4, it was decided to allow Ss 2, 3, and 4 to progress through the sets and make modifications for S_5. The following modifications were made:

A) When Ss 2, 3, and 4 reached criterion on Sets VI they were tested on Sets VI and VII and subsequently instructed on Set VII. Concurrently, S_5 continued to receive instruction on Set VI until he reached criterion. This procedure was followed whenever necessary.

B) If S_5 was schedule to be tested while Ss 2, 3, and 4 were being instructed on the same set, T tested S_5 before instruction was initiated with Ss 2, 3, and 4.

Thus, S_5 progressed through the twelve steps of the program while seated with his peers. However, depending upon his performance, he was either absorbed into the rotation with Ss 2, 3, and 4 or a separate set of word cards was used to accommodate the required increased number of training trials.

RESULTS

Part I

In a given trial, S_1 could make from 0-11 correct responses to a given set of cards. Criterion performance for each set consisted of three consecutive errorless trials. Following attainment of the criterion for each set, all sets taught previously and the set being taught next were tested. It was assumed that if S_1 could write the words correctly from a verbal cue, she could, in fact, spell the words correctly.

In the first testing phase (trials 1 and 2), S averaged 4.5, .5, 0, 3, and 0 correct responses to Set I-V respectively (Figure I-A).

During Trials 3-21, S_1 was taught to write the words in Set I. Criterion performance was attained after 19 teaching trials (Figure I-B).

Sets I and II were tested during trials 22-23. S_1 maintained perfect responding to Set I. The number of correct responses to Set II increased from an average of .5 during trials 1 and 2 to an average of 1.5 during trials 22-23 (Figure I-C).

During trials 24-33, $\underline{S}_1$ was taught to write the words in Set II. Criterion performance was attained after 10 teaching trials (Figure I-D).

Sets I, II, and III were tested during trials 34-35. $\underline{S}_1$ maintained perfect responding to Set II. The number of correct responses to Set I decreased from perfect responding during trials 22-23, to an average of 9.5 correct during trials 34-35. The number of correct responses to Set III increased from no correct responses during trials 1-2 to an average of 5.5 correct responses during trials 34-35 (Figure I-E).

During trials 36-47, $\underline{S}_1$ was taught to write the words in Set III. Criterion performance was attained after 12 teaching trials (Figure I-F).

Sets I, II, III, and IV were tested during trials 48-49. $\underline{S}_1$ maintained perfect responding to Set III. The number of correct responses to Set II decreased from perfect responding during trials 34-35, to an average of 9.5 correct. The number of correct responses to Set I decreased from an average of 9.5 correct responses during trials 34-35, to an average of 6.5 during trials 48-49. The number of correct responses to Set IV increased from an average of 3 during trials 1-2, to an average of 4 during trials 48-49 (Figure I-G).

During trials 50-56, $\underline{S}_1$ was taught to write the words in Set IV. Criterion performance was attained after 7 teaching trials (Figure I-H).

Sets I, II, III, IV, and V were tested during trials 57-58. $\underline{S}_1$ maintained perfect responding to Sets III and IV. The number of correct responses to Set II increased from an average of 9.5 correct responses during trials 48-49, to an average of 10 correct responses during trials 57-58. The number of correct responses to Set I increased from an average of 6.5 during trials 48-49, to an average of 9 correct responses during trials 57-58. The number of correct responses to Set V increased from 0 during trials 1-2, to an average of 3 during trials 57-58 (Figure I-I).

During trials 59-68, S was taught the words in Set V. Criterion performance was attained after 10 teaching trials (Figure I-J).

Sets I, II, III, IV, and V were tested during trials 69-70. S maintained perfect responding to Sets V and III. The number of correct responses to Set IV decreased from an average of 11 during trials 57-58 to an average of 10 during trials 69-70. The number of correct responses to Set II decreased from an average of 10 correct responses during trials 57-58 to an average of 9.5 during trials 69-70. The number of correct responses to Set I increased from an average of 9 correct responses during trials 57-58, to an average of 10 correct responses during trials 69-70 (Figure I-K).

During trials 71-73 all sets (55 words) were taught and criterion performance of two errorless trials was attained after 3 teaching trials.

Parts II and III

In a given trial Ss 2, 3, and 4 could make from 0-18 correct responses to a given set of cards and S_5 could make from 0-6 correct responses. Criterion performance for each set consisted of 3 consecutive errorless trials. Again it was assumed that if an S could write a word correctly in response to a verbal cue, he could, in fact, spell the word.

In the first testing phase, Ss 2, 3, and 4 averaged 2, 3, 0, 4.5 and 2 correct responses to Sets VI through X respectively (Figure I-A). S_5 averaged 0 correct responses to Sets VI through X (Figure III-A).

During trials 3-16, Ss 2, 3, and 4 were taught to write the words in Set VI. Criterion performance was attained after 14 teaching trials (Figure II-B). S_5 was taught to write the words in Set VI during trials 3-21. Criterion performance was attained after 19 trials (Figure III-B).

During trials 17-18, Ss 2, 3, and 4 were tested on Sets VI and VII. They averaged 17.5 on Set VI and increased from an average of 3 correct to Set VII during trials 1-2 to an average of 9.5 correct during trials 17-18 (Figure II-C).

$\underline{S}_5$ was tested on Sets VI and VII during trials 22-23. $\underline{S}_5$ maintained perfect responding to Set I; responding to Set VII increased from 0 correct during trials 1 and 2 to an average of 1.0 correct during trials 22-23 (Figure III-C).

During trials 19-25, Ss 2, 3, and 4 were taught to write the words in Set VII. Criterion performance was attained after 7 teaching trials (Figure II-D). $\underline{S}_5$ was taught to write the words in Set II during trials 24-30. Criterion performance was attained after 7 teaching trials (Figure III-D).

During trials 26-27, Ss 2, 3, and 4 were tested on Sets VII and VIII. Perfect responding was maintained in Set VII. Responses to Set VIII increased from 0 during trials 1-2 to an average of 2.5 during trials 26-27 (Figure II-E). $\underline{S}_5$ was tested on Sets VII-VIII during trials 31-32. Perfect responding to Set VII was maintained. Responses to Set VIII increased from 0 during trials 1-2 to an average of 0.5 during trials 31-32 (Figure III-E).

During trials 28-44, Ss 2, 3, and 4 were taught to write the words in Set VIII. Criterion performance was reached in 17 teaching trials (Figure II-F). $\underline{S}_5$ was taught to write the words in Set VIII during trials 33-45. Criterion was reached in 11 teaching trials (Figure III-F). (It should be noted that between trials 37 and 38 for Ss 2, 3, and 4 and between trials 42 and 43 for $\underline{S}_5$, no school was held for two weeks due to spring vacation).

During trials 45-46, Ss 2, 3, and 4 were tested on Sets VIII and IX and averaged 17.5 correct on Set VIII. Responses to Set IX increased from 4.5 correct during baseline to 10 correct during trials 45-46 (Figure II-G). $\underline{S}_5$ was tested on Sets VIII and IX during trials 46-47. $\underline{S}_5$ maintained perfect responding to Set VIII. Responses to Set IX remained at 0 correct, as in trials 1-2 (Figure III-G).

During trials 47-51, Ss 2, 3, and 4 were taught to write the words in Set IX. Criterion was reached in 5 teaching trials (Figure II-H). $\underline{S}_5$ was taught to write the words in Set IX during trials 48-57. Criterion was reached in ten teaching trials (Figure III-H).

*S*s 2, 3, and 4 were tested on Sets IX and X during trials 52-53. Correct responding to Set IX decreased from perfect responding during teaching to an average of 16 correct. Responding to Set X increased from an average of 2 correct during trials 1-2 to an average of 10 correct during trials 52-53 (Figure II-I). $\underline{S}_5$ was tested on Sets IX and X during trials 58-59. Perfect responding was maintained on Set IX. Responding to Set X remained at 0 correct as in trials 1-2.

During trials 54-57, *S*s 2, 3, and 4 were taught to write the words in Set X. Criterion performance was reached in 4 teaching trials (Figure II-J). $\underline{S}_5$ was taught to write the words in Set X during trials 60-68. Criterion was reached in 9 teaching trials (Figure III-J).

During trials 58-59, *S*s 2, 3, and 4 were tested on Set X and averaged 17.5 correct. $\underline{S}_5$ was tested on Set V during trials 69-70. Perfect responding was maintained.

During trials 60-61, *S*s 2, 3, and 4 were tested on Sets VI through X and averaged 12.5, 16, 14.5, 15.5, and 18 correct responses respectively (Figure II-L). During trials 71-72, $\underline{S}_5$ was tested on Sets VI through X and averaged 5.5, 3, 6, 5, and 6 correct responses respectively (Figure III-L).

During trials 62 and 63, *S*s 2, 3, and 4 were retaught to write the words and averaged 18 correct responses on Sets VIII and X respectively. During trials 62-64, *S*s 2, 3, and 4 reached criterion on Sets VII and IX respectively and during trials 62 to 66, *S*s 2, 3, and 4 reached criterion on Set VI (Figure II-M). $\underline{S}_5$ reached criterion on Sets VI through X during trials 73 and 74 (Figure II-M).

DISCUSSION

In Part I a teaching procedure was delineated and implemented which resulted in a severely emotionally disturbed student learning to spell 55 different words. In Part II the teaching procedures used in Part I were modified for use in a group instructional setting. The group teaching procedure resulted in three trainable level retarded students learning to spell 30 different words. Part III consisted of arranging the group instructional procedures in such a way as to allow for an anticipated slower acquisition rate of an additional trainable level student. This arrangement seemed to have been successful in that the student did learn the words in the group setting. Indeed, by the end of the program it appeared that the student could be absorbed into similar programs without individualization.

The program differed notably from commonly used assign-test methods of teaching spelling in that contingent and immediate incentives, modeling, imitation, direct training and continuous measurement were emphasized.

From inspection of Figures I, II, and III it can be discerned that differing degrees of generalization across sets did occur. That is, a savings in trials across certain sets as well as increases in the number of correct responses to several untaught sets were manifested. However, it is doubtful that higher degrees of generalization will occur without the systematic instruction of basic phonetic skills, including improved articulation, and the ability to associate sounds and sound blends with letters.

Further inspection of Figures I, II, and III reveals a decrease in responding to words previously taught to criterion. Procedures must be systematically developed to maintain long-term retention and performance of all words taught. This might be accomplished by scheduling reteaching sessions on each set of words, by teaching sets of words required to perform in reading workbooks, by teaching sets of words appropriate to note-leaving, and then systematically teaching skills necessary to leave notes.

Certainly, the program does not suggest that the problem of teaching spelling to low functioning students has been solved. Obviously, there are many more parameters of teaching spelling than have been attending to here. On the other hand, the procedures, as applied here, did result in the students acquiring the prescribed skills. This, in itself, is an optimistic note in that the results obtained here might encourage others to modify, improve, or expand the procedures in order to teach spelling to the students in their charge. If this occurs we will be less likely to assume that it is the student who cannot learn to spell.

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Figures

Figure I	Number of correct responses made by $\underline{S}_1$ under testing and teaching conditions: A) testing Sets I-VI; B) teaching Set I; C) testing Sets I and II; D) teaching Set II; E) testing Sets I, II, and III; F) teaching Set III; G) testing Sets I, II, III, and IV; H) teaching Set IV; I) testing Sets I, II, III, IV, and V; J) teaching Set V; K) testing Sets I, II, III, IV, and V; L) reteaching Sets I-V to criterion.
Figure II	Number of correct responses made by $\underline{S}$s 2, 3, and 4 under testing and teaching conditions: A) testing Sets VI-X; B) teaching Set VI; C) testing Sets VI and VII; D) teaching Set VII; E) testing Sets VII and VIII; F) teaching Set VIII; G) testing Sets VIII and IX; H) teaching Set IX; I) testing Sets IX and X; J) teaching Set X; K) testing Set X; L) testing Sets VI, VII, VIII, IX, and X; M) reteaching Sets VI-X to criterion.
Figure III	Number of correct responses made by $\underline{S}_5$ under testing and teaching conditions: A) testing Sets VI-X; B) teaching Set VI; C) testing Sets VI and VII; D) teaching Set VII; E) testing Sets VII and VIII; F) teaching Set VIII; G) testing Sets VIII and IX; H) teaching Set IX; I) testing Sets IX and X; J) teaching Set X; K) testing Set X; L) testing Sets VI, VII, VIII, IX and X; M) reteaching Sets VI-X to criterion.

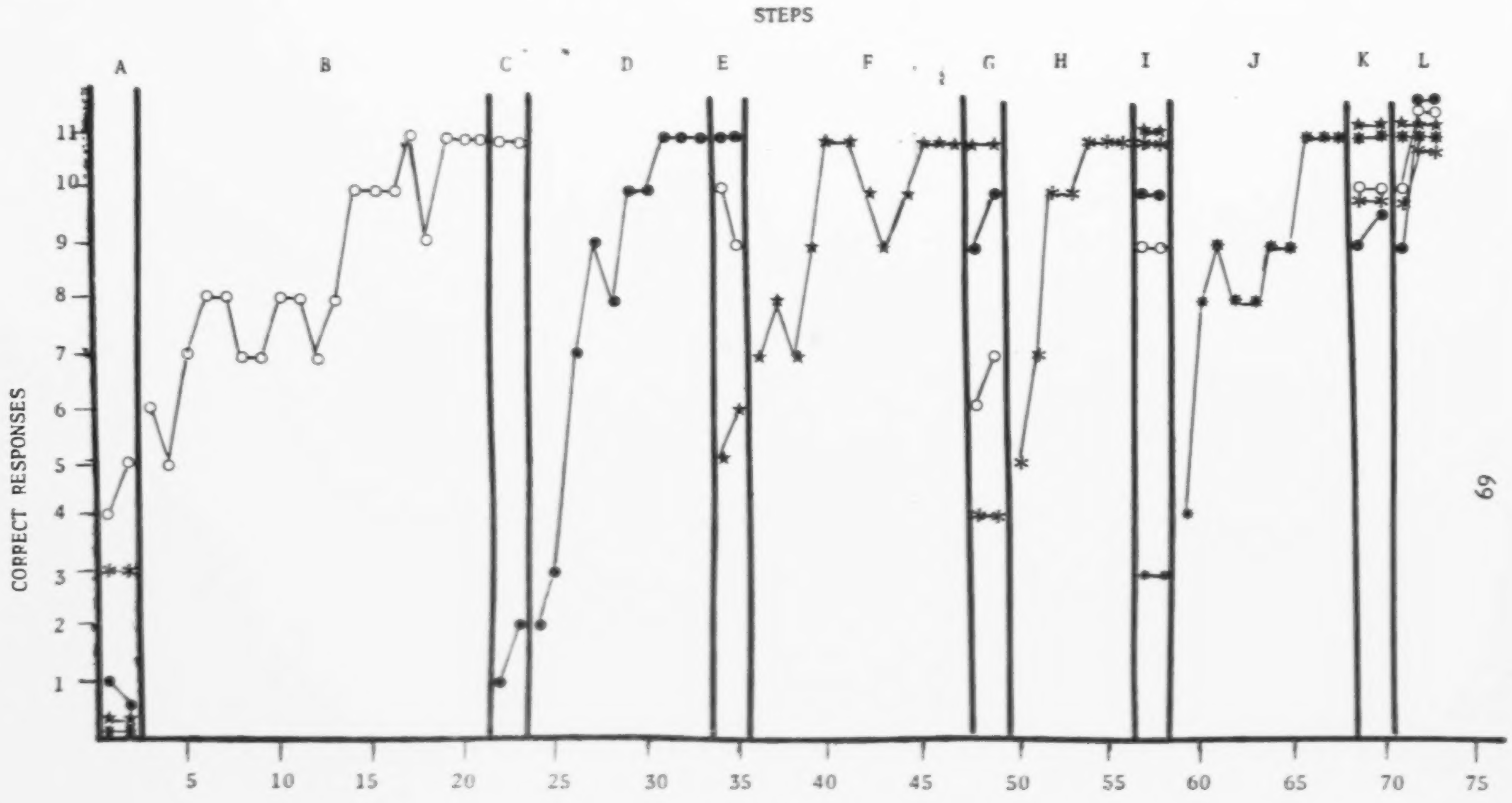
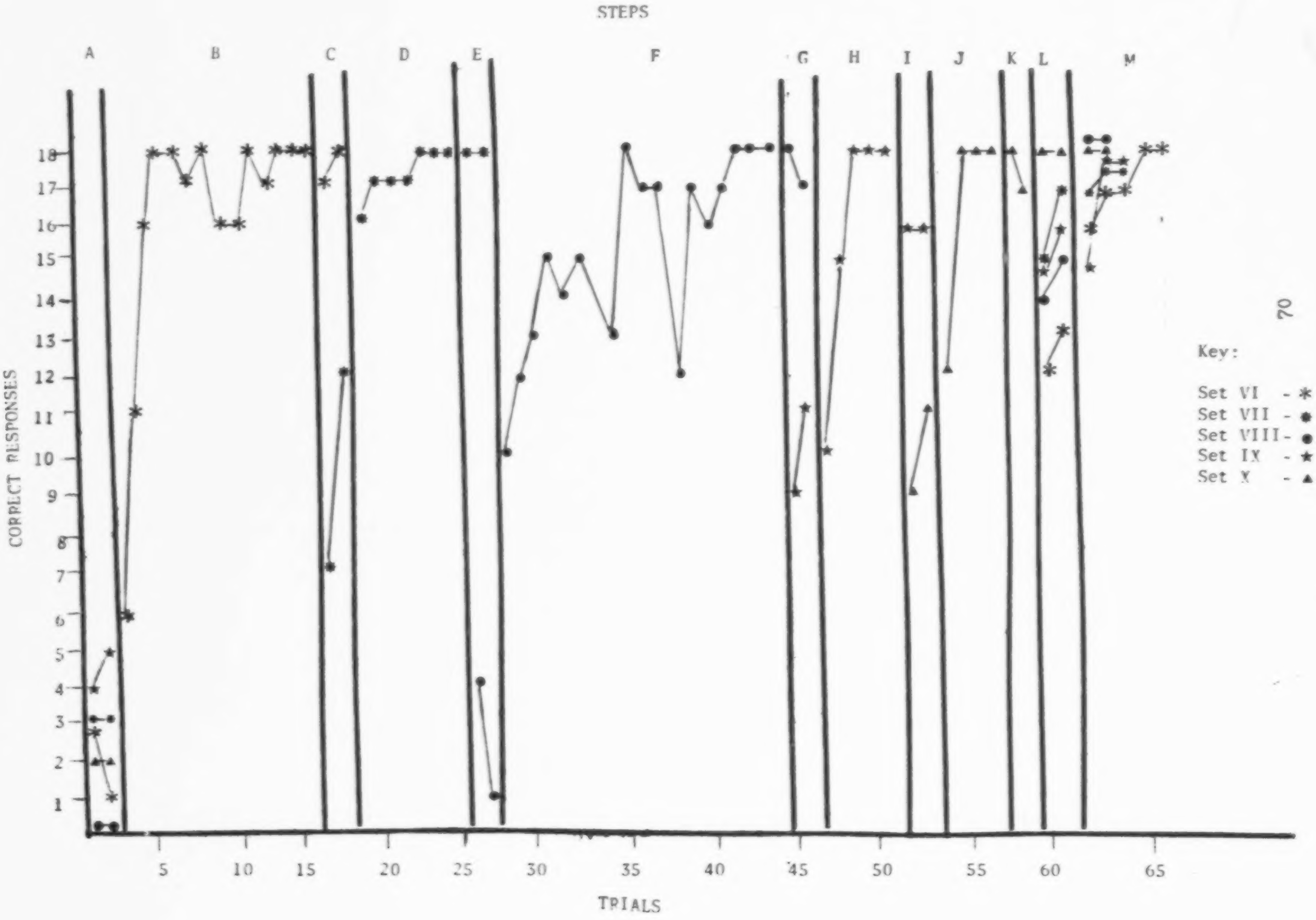


FIGURE I

Key:

Set I- ○
Set II - ●
Set III - ★
Set IV - ✱
Set V - ✸


STEPS
A
B
C
D
E
F
G
H
I
J
K
L
M
CORRECT RESPONSES
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
TRIALS
5
10
15
20
25
30
35
40
45
50
55
60
65
Key:
Set VI - ✳
Set VII - ✹
Set VIII- ●
Set IX - ★
Set X - ▲

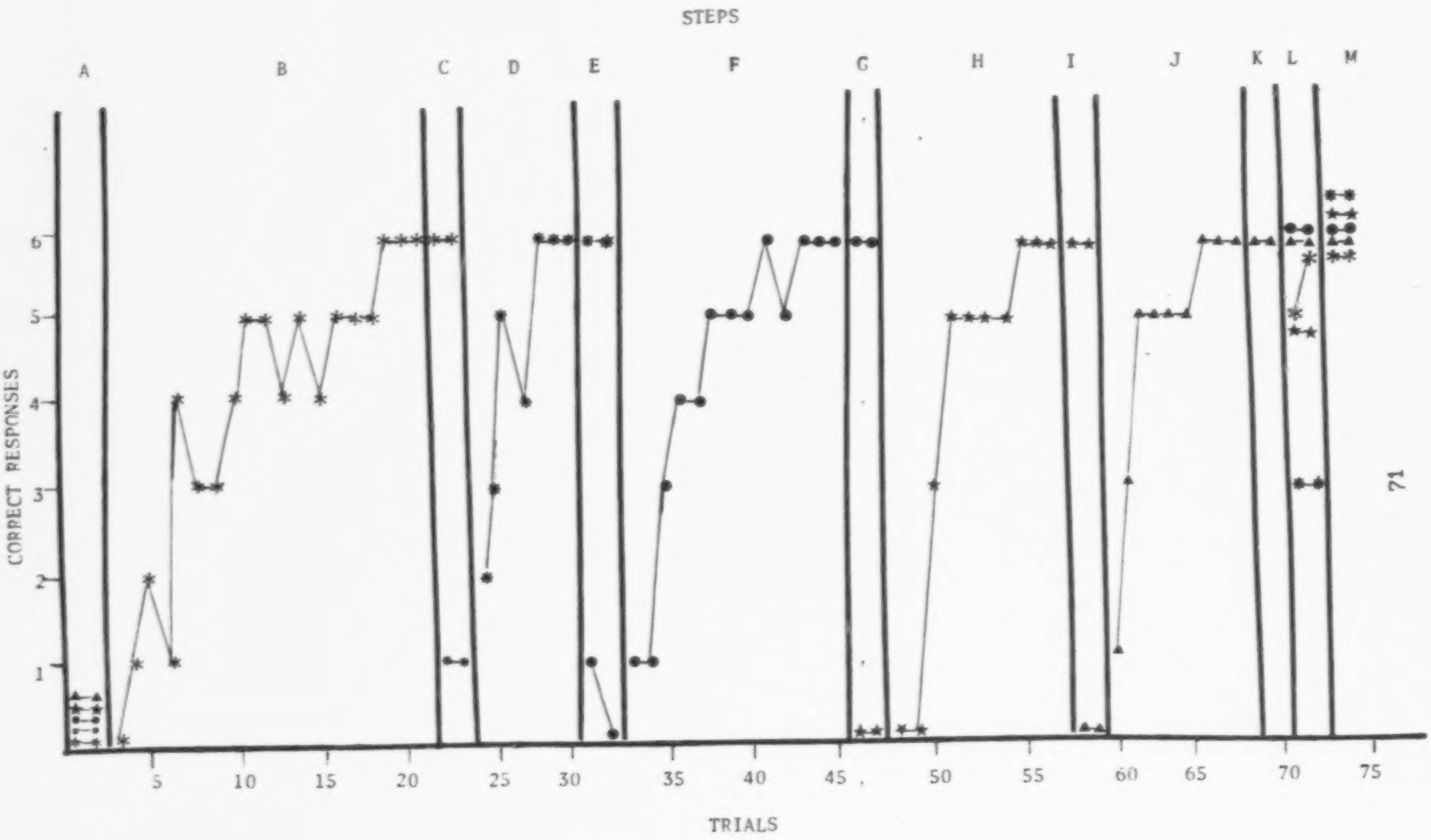


FIGURE III

Key:

Set VI - ✱
Set VII - ✸
Set VIII - ●
Set IX - ★
Set X - ▲

Set I

SAMPLE DATA SHEET

Date	Trial	map	fish	pant	this	in	on	thin	man	sit	pin	I	Total

SAMPLE WORK SHEET

Date ____________________

Set ____________________

Trial ____________________

1. ____________________

2. ____________________

3. ____________________

4. ____________________

5. ____________________

6. ____________________

7. ____________________

8 ____________________

9. ____________________

10. ____________________

11. ____________________

Teaching Trainable Level Students to Read Unconjugated Action Verbs

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Historically, teaching reading to trainable mentally retarded students has been confined to basic caution or safety words (Goldberg & Rooke, 1968; Kirk, 1972). However, it is becoming increasingly evident that such circumscribed instructional objectives are delimiting, in that in the near future the overwhelming majority of students labeled "trainable" will be expected to function in complex community settings rather than residential institutions.

During the past two years the authors and their colleagues have developed several programs designed to teach trainable level retarded students to read. These programs have been concerned with teaching students to verbally label sight words (Brown, Klemme, Hermanson, Haubrich, & Ora, 1970), to functionally read nouns and adjective-noun phrases (Brown, Troccolo, Heiser, Bellamy, & Sontag, 1972), to spell printed words (Brown, Bellamy, Bancroft, & Sontag, 1972), and to functionally read complete sentences which involve the verb form "to be" and nine different prepositions.

Except for the Brown, Bellamy, Bancroft and Sontag (1972) program referred to above, a "whole word" approach to reading was utilized. That is, the students involved were taught to verbally label a word in its entirety, without regard to phonetic, contextual or structural cues.

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[1] This demonstration was supported in part by funds from the Wisconsin State Department of Public Instruction and in part by NICHD Grant 5 P01 HD 03352-02 to the University of Wisconsin Center on Mental Retardation.

In addition to teaching the students to label the words and sentences, the students were taught to otherwise indicate that they understood the meaning of the words by touching the objects the words or sentences either referred to or represented. The additional requirement of indicating in a non-verbal manner that the words were understood was called functional reading (Brown and Perlmutter, 1971).

Although the students in the programs cited above were taught (in accordance with the definition offered) to read nouns, adjectives, articles, prepositions and one form of the verb "to be," it became clear to the authors that if a whole word system of teaching reading to trainable mentally retarded students was to be practical, a demonstration that the students can be taught to read at least unconjugated verbs was needed. The program reported here was an attempt to meet that need.

Teaching students to functionally read verbs presented different instructional problems than teaching the reading of adjectives, nouns and prepositions in that action or physical movement in some form is a necessary criterion of meaning. In an attempt to allow for action the following seven phase program was designed:

Phase I	Direct measures of the students' ability to perform five different physical actions, to label action pictures, to discriminate between different action pictures, to label words, to label words and then discriminate action pictures, and finally to label words and perform the appropriate physical actions.
Phase II	It was verified that the students could perform five different physical actions.
Phase III	The students were taught to label action pictures.
Phase IV	The students were taught to discriminate between five action pictures.
Phase V	The students were taught to label words.
Phase VI	The students were taught to label the words and then discriminate between the action pictures.
Phase VII	The students were taught to label the words and perform the action indicated by each.

Method

Students (Ss)

The 3 Ss (S_1, S_2, & S_3) ranged in age from 7 to 9 ($\bar{X}$=8), in IQ scores from 30 to 50 ($\bar{X}$=40), and in years in school from 3.5 to 5 ($\bar{X}$=4.25). Ss also received such medical diagnoses as mongolism, severe retardation, and severe learning disabilities. They were enrolled in the Badger school program for trainable level retarded students in the Madison Public School system.

Materials and Instructional Arrangement

A) A data sheet which allowed the teacher to record the responses of each S during each step of the program.

B) Five 5" x 8" flashcards (word cards) on which one of the following five words was printed: sit, run, walk, color, touch.

C) Five 8" x 8" pictures depicting (action pictures): 1) a boy running; 2) a boy walking; 3) a boy sitting; 4) a girl touching a dog; and 5) a girl coloring a picture. The five pictures were attached to a $2\frac{1}{2}$' x 3' flannel board.

D) Three plastic drinking cups, each marked with an Ss first name, a jar of pennies, and a supply of M&Ms.*

All teaching was conducted by the teacher (T) at one side of the classroom with Ss facing her in a semi-circle of chairs. A child's table and chair were placed nearby with a crayon and piece of paper placed atop the table.

Teaching procedure

Phase I - Obtaining baseline measures.

In Phase I baseline measures of Ss ability to perform the five different physical actions in response to verbal direction of T, to label the 5 action pictures, to discriminate between the 5 different action pictures, to label the 5 word cards, to label the 5 word cards and touch the corresponding action picture, and to label the 5 word cards and perform the corresponding actions were obtained.

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*(At the close of each daily session, Ss emptied their plastic drinking cups of pennies and counted as T exchanged one M&M for each accumulated penny.)

The baseline measures of *Ss* ability to *perform* the 5 different physical actions in response to verbal directions of *T* were obtained in the following manner:

> When *Ss* and *T* were seated facing the table containing a piece of paper and a crayon, *T* said to S_1, "*Walk* to the chair". If S_1 walked to the chair, *T* recorded a correct response and then said, "Now, *run* around the table." If S_1 ran around the table, *T* recorded a correct response and said, "Now, *sit* in the chair." If S_1 sat in the chair *T* recorded a correct response and then said, "Now, *touch* the table." If S_1 touched the table *T* recorded a correct response and said, "Now, *color* the paper." When S_1 had the opportunity to respond to the five verbal directions *T* said, "Thank you," directed S_1 to return to her seat and repeated the above sequence with S_2 and S_3 respectively.

Each *S* was given 3 opportunities to respond to the five verbal directions. The baseline measures of *Ss* ability to *label* the 5 action pictures were obtained in the following manner:

> *T* and *Ss* 1, 2, & 3 were seated facing the flannel board containing the 5 action pictures. *T* then pointed to one of the pictures and said to S_1, "What is the girl (boy) in the picture doing?" *T* then recorded the response (correct or incorrect). Feedback to S_1 as to whether the response was correct or incorrect was not provided. *T* then pointed to a second picture and said to S_2, "What is the girl (boy) in the picture doing?" *T* then recorded the response (correct or incorrect) but did not provide feedback. *T* then pointed to a third picture and said to S_3, "What is the boy (girl) in the picture doing?", recorded the response, etc. *T* then asked S_1 to label a fourth picture, etc., and S_2 to label a fifth picture, etc., until each *S* had had the opportunity to respond to each of the 5 pictures on three occasions.

The baseline measures of *Ss*' ability to *discriminate* between the 5 action pictures were obtained in the following manner:

> *T* said to S_1, "Point to the (*sitting*) picture". *S's* response was recorded (correct or incorrect) but feedback as to whether the response was correct or incorrect was not provided. *T* then said to S_2 "Point to the (*running*) picture". *T* then recorded the response, but did not provide feedback. This procedure was followed until each *S* had had the opportunity to respond to the verbal directions related to the 5 action pictures on three consecutive occasions.

The baseline measures of *Ss*' ability to *label the 5 word cards* were obtained in the following manner:

> T presented a word card to S_1 and said, "What is this word?" After S_1 responded, the response was scored and recorded. A second word card was presented to S_2 etc., until each S had had the opportunity to label each of the 5 word cards on three consecutive occasions.

The baseline measures of Ss' ability to label the five word cards and touch the corresponding action pictures were obtained in the following manner:

> T presented a word card to S_1 and said, "What is this word?" If S_1 did not label the word correctly, an incorrect response was recorded and a second word card was presented to S_2. If S_1 responded correctly, T said, "Now touch the picture of it". If S_1 touched the picture representing the word card she had just labeled, a correct response was recorded and a second word card was presented to S_2 etc., until each S had had the opportunity to label and touch each of the 5 word cards and action pictures respectively on three consecutive occasions.

The baseline measures of Ss' ability to label the five word cards and perform the corresponding physical actions were obtained in the following manner:

> T presented a word card to S_1 and said, "What is this word?" If S_1 did not label the word correctly, an incorrect response was recorded and a second word card was presented to S_2. If S_1 responded correctly, T said, "Now, do it". If S_1 performed the appropriate action a correct response was recorded and a second word card was presented to S_2 etc., until each S had had the opportunity to label each of the 5 word cards and perform the corresponding 5 physical actions on three consecutive occasions.

Phase II - Teaching Ss to perform physical actions in response to verbal cues.

During Phase I Ss demonstrated their ability to perform the 5 physical actions in response to the verbal directions of T.

Phase III - Teaching Ss to verbally label action pictures.

Prior to instruction T touched each action picture on the flannel board, said, to Ss as a group, "What is the girl (boy) in the picture doing?", and modeled the correct response using the progressive verb forms (e.g. running, sitting).

Subsequently, T touched an action picture and said to S_1, "What is the girl (boy) in the picture doing?" If S_1 responded correctly T said, "Good, great" etc., while recording the response and handed a penny to S_1 which he placed in his plastic drinking cup. If S_1 did not respond correctly, T said, "No, that is not right," touched the appropriate action picture and modeled the correct response (e.g., "The boy (girl) is sitting"). T then pointed to the same picture and said, "What is the girl (boy) in the picture doing?" If S_1 responded correctly, T said, "Great, good," but did not award a penny. If S_1 did not respond correctly, T again said, "No, that is not right," touched the appropriate action picture, and modeled the correct response. T then touched a different action picture and said to S$_2$, "What is the girl (boy) in the picture doing?", etc. This procedure was followed until each S could label the 5 action pictures without assistance from T in response to the first verbal direction on three consecutive occasions.

Phase IV - Teaching Ss to discriminate between [illegible] action pictures.

T said to S$_1$, "Touch the (sitting) picture". If S$_1$ responded correctly, T said, "Great, good" etc., while recording the response, and handed S$_1$ a penny which he placed in his cup. If S$_1$ did not respond correctly, T said, "No, that is not right," touched the appropriate action picture and modeled the correct response ("This is the sitting picture"). T then said to S$_1$, "Touch the (sitting) picture." If S$_1$ responded correctly T said, "Great, good" but did not reward him with a penny. If S$_1$ did not respond correctly, T again said, "No, that is not right," touched the appropriate action picture and modeled the correct response. T then said to S$_2$, "Touch the (running) picture," etc. This procedure was followed until each S could touch the 5 action pictures in response to the first verbal direction of T on three consecutive occasions.

Phase V - Teaching Ss to label the word cards.

Prior to instruction T presented each word card to the three Ss and said, "Everyone look at this word card. This word is (sit). Now, what is this word?" T then called upon each S to match the verbal label T modeled.

Subsequently T presented S$_1$ with a word card and said, "What is this word?" If S$_1$ responded correctly T said, "Great, good" etc., while recording the response and handed S$_1$ a penny which he placed in his cup. If S$_1$ did not respond correctly, T said, "No, that is not right. This word is (sit)." T then said to S$_1$, "What is this word?" If S$_1$ responded correctly, T said, "Great, good" etc., but did not award a penny. If S$_1$ did not respond correctly, T again said, "No, that is not right" and modeled the correct response. T then presented another word card to

S_2, said, "What is this word?" etc. This procedure was followed until each *S* could label the 5 word cards without assistance from *T* in response to the first verbal direction on three consecutive occasions.

Phase VI - *Teaching functional reading of verbs*.

T presented a word card to S_1 and said, "What is this word?" If S_1 responded correctly *T* said, "Good, now touch the picture of it." If S_1 both labeled the word card correctly and touched the corresponding picture, she was congratulated, a correct response was recorded and a penny was given to him. If S_1 did not label the word card correctly an incorrect response was recorded, *T* said, "No, I am sorry, you did not say the right word. This word is ______". *T* then said, "What is this word?" If S_1 responded correctly *T* then said, "Great, good. Now touch the picture of it". If S_1 responded correctly *T* then said, "Great, good" but did not reward S_1 with a penny. *T* then presented another word card to S_2 and said, "What is this word?" etc. These procedures were followed until each *S* correctly labeled the five word cards and touched the corresponding five action pictures in response to the first verbal direction of *T* on three consecutive occasions.

Phase VII - *Teaching Ss to label the word cards and perform the appropriate actions*.

Exactly the same procedures used to teach *Ss* to label the word card and touch the corresponding pictures in Phase VI were used here, except that instead of pointing to an action picture, *Ss* were required to perform the action indicated by the word card.

Results

During Phase I, it was possible for the 3 *Ss* together to make from 0 to 15 correct responses in any given trial in performing the five different physical actions, labeling action pictures, discriminating between different action pictures, labeling words, labeling words and then discriminating action pictures, and finally labeling words and then performing the appropriate physical actions. As can be discerned from Figure I-A, Ss performed 15, 15 and 15 of the 15 physical actions correctly in trials 1, 2, and 3 respectively; Ss labeled 10, 13 and 11 of the 15 action pictures presented correctly in trials 1, 2, and 3 respectively; Ss correctly discriminated between 9, 10, and 9 of the 15 action pictures presented in trials 1, 2, and 3 respectively; Ss correctly labeled 1, 0, and 0 of the 15 word cards presented in trials 1, 2, and 3 respectively; Ss labeled 2, 0, and 0 of the 15 word cards presented and discriminated the appropriate 15 action action pictures correctly in trials 1, 2, and 3 respectively; and Ss labeled 1, 0, and 0 of the 15 word cards and performed the 15 appropriate physical actions correctly in trials 1, 2, and 3 respectively.

As may be seen in Figure I-A, it was verified that Ss could perform 15 different physical actions and thus no teaching trials were necessary in Phase II.

As can be discerned from Figure I-B (Phase III), the number of correct labeling responses made to the action pictures increased from 11 of 15 in trial 4 to 15 of 15 in trials 6, 7, and 8. It should be noted that Ss responses containing any tense of the appropriate verb were counted correct during all seven phases of the program.

In Phase IV (Figure I-C), Ss demonstrated little difficulty in acquiring the skills necessary to discriminate between the different action pictures. That is, Ss made 10 correct discriminations of 15 in trial 9 and 15 of 15 in trials 10, 11, and 12.

As can be discerned from Figure I-D (Phase V), the number of correct labeling responses made to the word cards increased from 8 of 15 in trial 13 to 15 of 15 in trials 23, 24, and 25.

In Phase VI (Figure I-E), Ss made 0, 3, 0, and 1 errors in trials 26, 27, 28, and 29 before they could functionally read the 15 word cards on 3 consecutive occasions in trials 30, 31, and 32.

Finally, as can be seen in Figure I-F (Phase VII), Ss correctly labeled 15 of 15 word cards and responded with the appropriate physical actions in trials 33, 34, and 35.

Discussion

In accordance with the definition offered, three young trainable level retarded students were taught to functionally read five unconjugated action verbs. Thus, instructional programs have been delineated and implemented that have resulted in trainable level students learning to read adjectives, nouns, (Brown, Troccolo, Jones, Heiser, Bellamy, & Sontag, 1972) verbs, articles and prepositions (Brown and Perlmutter, 1971). It should be emphasized, however, that different students were involved in each of the programs alluded to above.

It would be gratifying indeed to claim that the problem of teaching trainable level students to read to the degree that they can function effectively in a community setting has been solved. Obviously, such claims cannot be made. The program described here and those cited elsewhere, while encouraging, leave many questions unanswered. For example, it is quite probable that the "whole word" method of teaching reading, at least as it has been described here, can result in substantial gains in reading achievement. However, it is doubtful, and should be unnecessary, that teachers teach their students to read every word, every verb conjugation, and every plural and abbreviation they must learn, using this method. Effective methods of teaching word attack skills, phonetics, etc., must be delineated and verified empirically for use with this level student.

Teaching trainable level students phonetically, of course, presents extraordinary instructional difficulties in that it is the rare trainable level student who brings to school the requisite articulation skills. On the other hand, it may be possible to provide classroom teachers with many of the technological expertise of speech and language therapists which might allow them to teach their students the required articulation skills.

Nevertheless, it does appear that in the recent past progress has been made if only in the sense that teachers are rejecting their custodial, potholder orientation and are becoming increasingly intent upon teaching trainable students a variety of complex and necessary academic skills.

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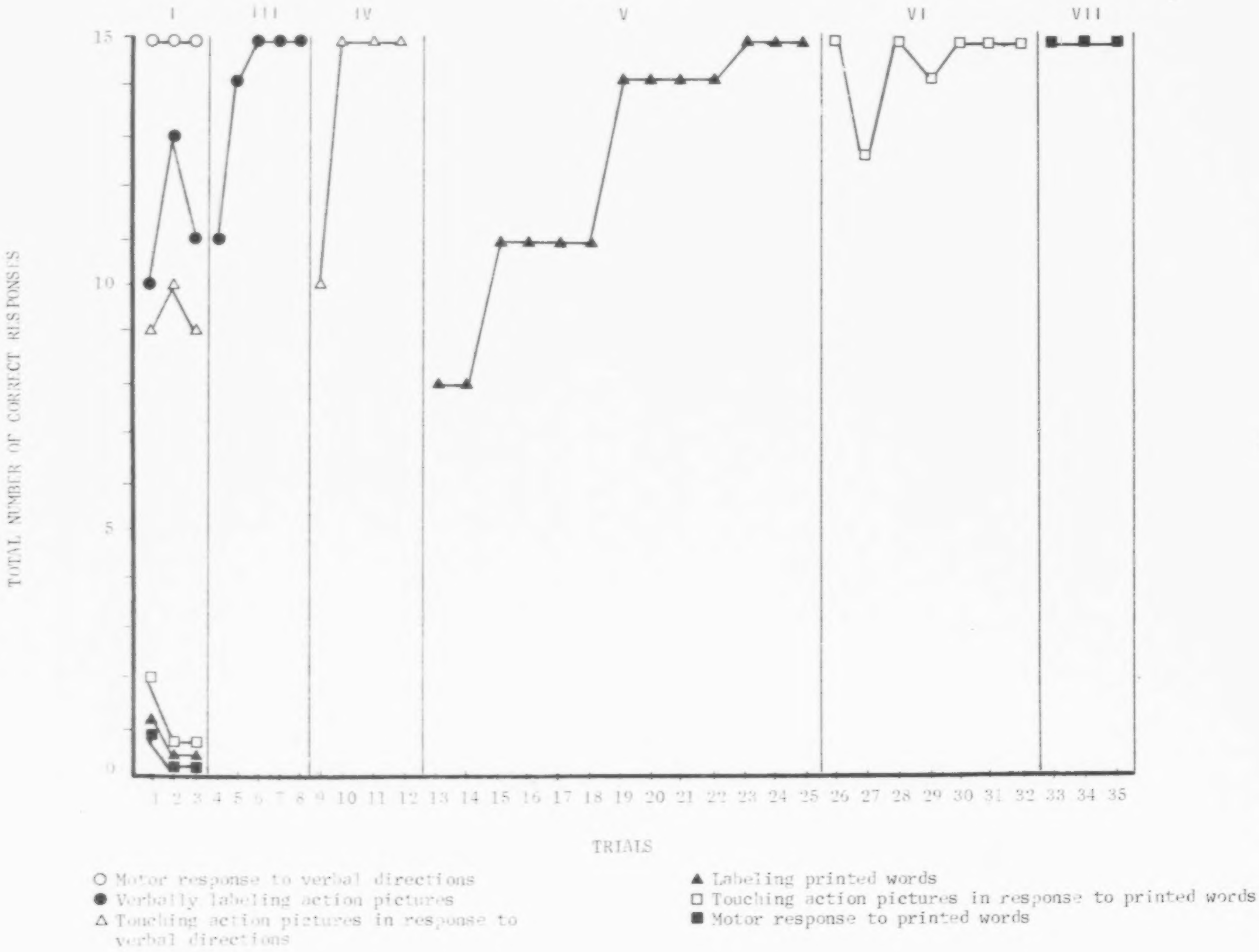
Kirk, S. A. Educating exceptional children. (2nd ed.) Boston, Mass.: Houghton Mifflin Company, 1972.

Figure I Number of correct responses made by three Ss during Phases I baseline; III teaching Ss to verbally label action pictures; IV teaching Ss to discriminate between action pictures; V teaching Ss to label word cards; VI teaching functional reading of verbs; VII teaching Ss to label the word cards and perform the appropriate actions.

VERB PROGRAM



Teaching Adolescent Trainable Level Retarded Students to Read a Restaurant Menu

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When hungry and not at home, most people have within their behavioral repertoire the skills necessary to enter a restaurant, sit down, read a menu, and order the food of their choice. Rarely is such a chain of behavioral events systematically programmed. Indeed, most persons in our culture acquire such skills indirectly or vicariously through imitating parents, etc.

When trainable level retarded persons are hungry and not at home, the chain of behavioral events is different. It is the rare trainable level retarded person who enters a restaurant, orders, eats and pays for food by himself. Usually, if a trainable level retarded person is taken to a restaurant at all, a parent, grandparent or some other adult assumes the responsibility of selecting and paying for his food.

If, in fact, it is true that a person is incapable of functioning adaptively in a restaurant, then having some other person assist him is justifiable. However, if a person is capable of acquiring the skills necessary to function adaptively in a restaurant but has not been taught to do so or is not allowed to do so, having another person perform the behaviors for him is unjustifiable; for at least the following reasons. First, in our culture, doing for someone that which he or she can do for himself is unjustified. Second, doing for someone that which he can do for himself is longitudinally maladaptive in that it fosters long term interpersonal

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[1] This demonstration was supported in part by funds from the Wisconsin State Department of Public Instruction, in part by NICHD Grant 5 P01 HD 03352-02 to the University of Wisconsin Center on Mental Retardation and in part by the Madison District office of the State of Wisconsin Division of Vocational Rehabilitation.

dependence and concommittently reduces the probability that the person will acquire the behavioral repertoire necessary to function even quasi-independently in a complex social-vocational setting.

The demonstration reported here is a component of a public school program whose ultimate objective is the development of a behavioral repertoire in trainable level retarded students that will allow them to live and work independently in a community setting. More specifically, the demonstration is concerned with teaching trainable level retarded students to function adaptively in a public restaurant.

The entire demonstration was divided into the following six phases.

Phase I	Direct measures of the students ability to label pictures of foods, to label the words corresponding to the foods, to label the words and touch the corresponding picture, and to label the words on a "menu" were obtained.
Phase II	The students were taught to label pictures of common foods.
Phase III	The students were taught to label the printed words that represented the pictures of the common foods.
Phase IV	In accordance with the definition of functional reading offered by Brown and Perlmutter (1971), the students were taught to label each word and touch the picture of the food the word represented.
Phase V	The students were taught to label the words from top to bottom on a teacher-made vertically arranged "menu".
Phase VI	The students were brought to a public restaurant, and given the opportunity to order a meal from the teacher-made menu.

Method

Students (Ss)

Four female Ss (S_1, S_2, S_3, & S_4) ranging in CA from 10 to 18 years ($\bar{X}$=14.3) in IQ from 38 to 47 ($\bar{X}$=44) and years in public school 0-11 ($\bar{X}$=6.5).

Three S's tested at the pre-primer reading level based on an informal reading inventory from the Lyons-Carnahan basal reading series that was taken a month before the start of the demonstration. The fourth S did not attend public school prior to the initiation of the program and information concerning her reading level was unavailable.

The following diagnostic labels and descriptive statements were extracted from the cumulative folders of Ss: "mongoloid," "doubtful (S) will learn to read," "only able to attend on one-to-one basis," "echolalic," "not able to take criticism," "psychological blocks preventing positive functioning," "static CNS disease," "easily distracted," "delayed language," "at plateau as far as academic skills," "short memory span," "often confused on visual discrimination," "brain damage," "severely hyperactive," "visual perceptual problems," "moderately retarded," "severely disturbed," "day dreams," "psychiatrist might be able to help."

Materials and Instructional Arrangement

1) Instructional materials consisted of 15 food pictures: 11 pictures of milk, bacon, chocolate milk, hamburger, root beer, pancakes, fried eggs, orange juice, french fries, hot dogs and ham taken from the Peabody Language Development Kit (Dunn and Smith, 1968). Four pictures of waffles, milk shake, barbecue and sausage links taken from popular commercial magazines.
2) 15 word cards of the 15 nouns and adjectives that corresponded to the 15 foods. These word cards were randomly divided into five 3 word sets (Set I - milk, barbecue, orange juice; Set II - chocolate milk, ham, waffles; Set III - hamburger, pancakes, milk shake; Set IV - bacon, fried eggs, hot dogs; Set V - french fries, sausage links, root beer.)
3) An $8\frac{1}{2}$" x 11" piece of paper upon which the 15 words were vertically arranged (menu). The 15 words were arranged from top to bottom in the following order: pancakes, waffles, fried eggs, bacon, ham, sausage links, milk, orange juice, hamburger, hot dog, barbecue, french fries, chocolate milk, milk shake, root beer.
4) A data sheet was constructed that allowed for the recording of each response each S made in each phase.
5) Pennies were used as contingent consequences for correct responding during word labeling review sessions.

Phases I through V were conducted in a classroom. Phase VI was conducted at a public restaurant. In the classroom, Ss and T were seated at a rectangular table.

Teaching Procedure

Phase I - Obtaining baseline measures. In Phase I baseline measures of Ss' ability to label the 15 food pictures, to label the 15 word cards, to label the 15 word cards and touch the corresponding food pictures, to label words from top to bottom on the menu were obtained.

The baseline measures of Ss' ability to label the 15 food pictures were obtained in the following manner:

Ss and T were seated around the table. T presented one food picture to S_1 and said, "What is this?" After S_1 responded, the response was scored for correctness or incorrectness and recorded on the data sheet. A second card was then presented to S_2 and T said, "What is this?" After S_2 responded, the response was scored and recorded on the data sheet. A third card was presented to S_3 etc., until each S had an opportunity to respond to each of the 15 food pictures on these occasions.

The baseline measures of Ss' ability to label the 15 word cards were obtained in the following manner:

T presented a word card to S_1 and said, "What is this word?" After S_1 responded, the response was scored and recorded. A second word card was presented to S_2 etc., until each S had the opportunity to label each of the 15 word cards on three consecutive occasions.

The baseline measures of Ss' ability to label the 15 word cards and touch the corresponding food pictures were obtained in the following manner:

When Ss and T were seated around the table, T randomly arranged the 15 picture cards in 3 rows of 5 in each row. T then presented a word card to S_1 and said, 'What is this word?" If S_1 did not label the word correctly, an incorrect response was recorded and a second word card was presented to S_2. If S_1 responded correctly, *T* said, "Now touch the picture of it". If S_1 touched the picture representing the word card she had just labeled, a correct response was recorded and a second word card was presented to S_2 etc., until each *S* had the opportunity to label and touch each of the 15 food cards and word pictures respectively on three occasions.

The baseline measures of *Ss*' ability to label the word from top to bottom on the menu were obtained in the following manner:

When *Ss* were seated around the table, *T* presented a menu to S_1 and said, "Read the words on the menu" (*T* pointed to each word from top to bottom as S_1 labeled the word). All responses were scored and recorded. *T* then presented the words to S_2 etc., until each *S* had the opportunity to label the 15 words on the menu on three occasions.

Baseline measures of the *Ss*' ability to order from a menu in a restaurant were not obtained.

Phase II - *Teaching Ss to label the food pictures*. During Phase I *Ss* demonstrated the ability to label some of the food pictures correctly. Thus, in Phase II it was necessary to teach *Ss* to label only the food pictures they could not label in Phase I. Prior to teaching, *Ss* were told that as soon as they learned to read the menu, they would all go to a restaurant in the community[2] to order and eat their own food. The procedures used to teach *Ss* to label the food pictures were as follows:

T presented a food picture to S_1 and said, "What is this?" If S_1 responded correctly, *T* recorded the response and said, "Good, beautiful, nice job," etc. If $\underline{S}_1$ did not respond correctly *T* recorded the response and said, "No, this is a picture of (milk). Now look at the picture (*T* pointed to the picture) and say (milk)." If $\underline{S}_1$ matched the response modeled by *T*, *T* said, "Good, great," etc. If $\underline{S}_1$ did not match the response *T* modeled, *T* modeled the response again. If $\underline{S}_1$ still did not match the response, *T* presented a second picture to $\underline{S}_2$. This procedure was followed until each *S* correctly labeled the pictures they did not label correctly during Phase I. Subsequently, each *S* was given the opportunity to label the entire set of food pictures.

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[2] Appreciation is expressed to Mr. Ron Oliver, manager, and Sue Carley and Verda Hilty, waitresses, Country Kitchen restaurant, Madison, Wisconsin, for their cooperation in the implementation of this demonstration.

Phase III - *Teaching Ss to label word cards and review.*

T presented $\underline{S}_1$ with the first word in Set I (milk) and said, "What is this word?" If $\underline{S}_1$ responded correctly *T* said, "Great, good," etc. while recording the response. If $\underline{S}_1$ did not respond correctly, *T* said, "No, that is not right, this word is ___ (milk). Now, look at the word and say *milk*." *T* continued to model the correct response until $\underline{S}_1$ matched it. *T* then presented the second word in Set I to $\underline{S}_2$ etc., the third word in Set I to $\underline{S}_3$ etc., the first word in Set I to $\underline{S}_4$ etc., until each *S* could label the three words in Set I without assistance from *T* on two consecutive occasions.

This procedure was then used to teach *Ss* to label the words in Sets II, III, IV, & V respectively. After *Ss* reached criterion on a particular Set, a review session concerning all the words learned in the previous Sets was held. For example, after *Ss* reached criterion on Set III, a review of Sets I, II, & III was conducted. During the review sessions the word cards were put in a pile and shuffled and *Ss* were asked to label each word as they were presented by the teacher. The review session was conducted as follows:

T presented the first 3 words (one at a time) in the pile to $\underline{S}_1$ and asked her to label them. *T* corrected all incorrect responses. If $\underline{S}_1$ labeled all three words T gave S_1 a penny which was to be saved to help pay for her meal in the restaurant.

When Ss reached criterion on the 5 Sets, the review consisted of each S having the opportunity to label all 15 words. This procedure was followed until each S correctly labeled 15 word cards on two consecutive occasions.

Phase IV - Teaching functional reading.

Once Ss could label the 15 food pictures and the 15 word cards, the following procedures were used to teach Ss to label the word cards and touch the corresponding food pictures (functional reading).

> The 15 food pictures were randomly placed on the table in three rows of five pictures each. T presented S_1 a word card and said, "What is this word?" If S_1 responded correctly T said, "Good, now touch the picture of it." If S_1 both labeled the word card correctly and touched the corresponding food picture, she was congratulated and a correct response was recorded. If S_1 did not label the word card correctly an incorrect response was recorded, T said, "No, I am sorry, you did not say the right word", and presented the second word card to S_2. If S_1 labeled the word card correctly but did not touch the corresponding food picture T said, "No, I am sorry, but you did not touch the right picture", and presented the second word card to S_3, etc.

These procedures were followed until each S correctly labeled the 15 word cards and touched the corresponding 15 food pictures on two consecutive occasions.

Phase V - Teaching Ss to read menus.

T presented S_1 with a menu and said, "Touch the top word on the menu and tell me what it is" (T placed the index finger of S_1 on the paper to the immediate left of the word). If S_1 responded appropriately T said, "Good, now read the other words". All responses were recorded as correct or incorrect but incorrect responses were not corrected. After S_1 labeled the 15 nouns and adjectives on the menu, T presented the menu to S_2 etc., until each S labeled all the nouns and adjectives on the menu on two consecutive occasions.

Phase VI - Ordering a meal at a restaurant.

T brought the four Ss to a local restaurant for a noon meal. The waitress came to the table and distributed a copy of the menus used in the teaching program to each *S*. *T* then said to S_1, 'Look at the menu and decide what you want to eat. When you have decided what you want to eat, touch the word on the menu and tell the waitress what the word says." This procedure was followed until each *S* ordered the foods of her choice.

Results

During Phase I, the 4 *Ss* combined could make from 0 to 60 correct responses to the food pictures, the word cards, food pictures and word cards combined, and to the menu in any given trial. As can be discerned from Figure 1A, *Ss* labeled 41, 45 and 43 of the 60 food pictures presented correctly in trials 1, 2, & 3 respectively; *Ss* labeled 5, 4, & 4 of the 60 word cards presented correctly in trials 1, 2, & 3 respectively; *Ss* functionally read 10, [illegible], & 8 of the 60 word cards presented correctly in trials 1, 2, & 3 respectively; and *Ss* labeled 8, 11, & 8 of the 60 words and phrases on the menu correctly in trials 1, 2, & 3 respectively.

As can be discerned from Figure 1B, (Phase II), the number of correct responses made to the food pictures increased from 53 of 60 in trial 4 to 60 of 60 in trials 19 and 20. It should be noted that if *Ss* labeled a food picture correctly on three occasions during Phase I, that number of correct responses was assumed in trials 4 through 16. In addition, it should be noted that during trials 16 through 20 each *S* was requested to label each of the 15 pictures.

In Phase III, *Ss* manifested little difficulty acquiring the skills necessary to label the word cards. That is, *Ss* made 5, 2, 2, 1, & 1 errors before they could label the words in Sets I, II, III, IV, & V correctly on three consecutive occasions. Subsequent to *Ss* reaching criterion on the Sets, they were requested to label all fifteen words. As can be discerned from Figure 10, 239 of 240 possible correct responses were recorded during trials 21 through 24.

As can be discerned from Figures 1E and 1F, trials 25, 26, 27, & 28 respectively, Ss made 120 functional reading responses without an error and made 179 of 180 possible correct responses to the menu.

Data reflecting performance in the public restaurant is not contained in Figure 1. It should be noted that S_1 correctly ordered a hamburger, root beer, and french fries, S_2 correctly ordered a milkshake (chocolate) and a hamburger, S_3 correctly ordered barbecue, root beer, and french fries, and S_4 correctly ordered a hot dog, french fries, and a milkshake (strawberry).

In an attempt to measure retention of part of the material that was taught in the formal program, Ss were asked to label the words on the menu (Phase II) on three subsequent occasions (30, 60, 120, & 180 days after they had ordered correctly in the restaurant). Ss made 59 and 59 out of 60 possible correct responses respectively on the 30 and 60 day retention trials, 55 out of 60 possible correct responses on the 120 day retention trial, and 60 out of 60 correct responses on the 180 day retention trial.

Discussion

Inspection of Figure 1 clearly suggests that the students acquired the skills the teacher intended to teach. That is, during Phase I the only skill that the students could perform reasonably well was to label the food pictures. They could not label the words and therefore could neither meet the requirements of functional reading nor could they label the words on the menu. Thus, it is extremely doubtful that without instruction they could have performed acceptably in the restaurant.

Inspection of Figure 1 also strongly suggests that once the students were taught to label the food pictures (Phase II) and the word cards (Phase III) they manifested no difficulty either meeting the requirements of functional reading or labeling the words on the menu. This, suggests that the students made the cognitive association between the words and the pictures without systematic instruction.

Throughout the organization and implementation of the program several deficits of both the program and the prior training of the students became manifest; these deficits, of course, must be removed before the students can be considered prepared to function independently in a restaurant. For example, they must be taught A) to use public transportation to get to the restaurant; B) to function effectively vocationally so that they can earn the money to spend in a restaurant; C) to use the appropriate math concepts necessary to budget and expend their funds; D) to emit appropriate social and etiquette repertoires expected in a restaurant; and E) to read the many varied kinds of actual restaurant menus in use. While these and other deficits were apparent, the results thus far suggest that the skills required to teach independent functioning in a restaurant are well within the capabilities of the students.

It should be emphasized that the students were quite enthusiastic about the program, especially after they were informed that they would be taken to a restaurant to order the food of their choice. In fact, when the students involved in this program informed their peers about what they were learning and that they would soon be going to a restaurant to order the food of their choice their peers requested that they be given a chance to participate in a similar program. Subsequently, three additional groups of 4, 4, & 5 trainable level retarded students were put through the same program described here with similar results.

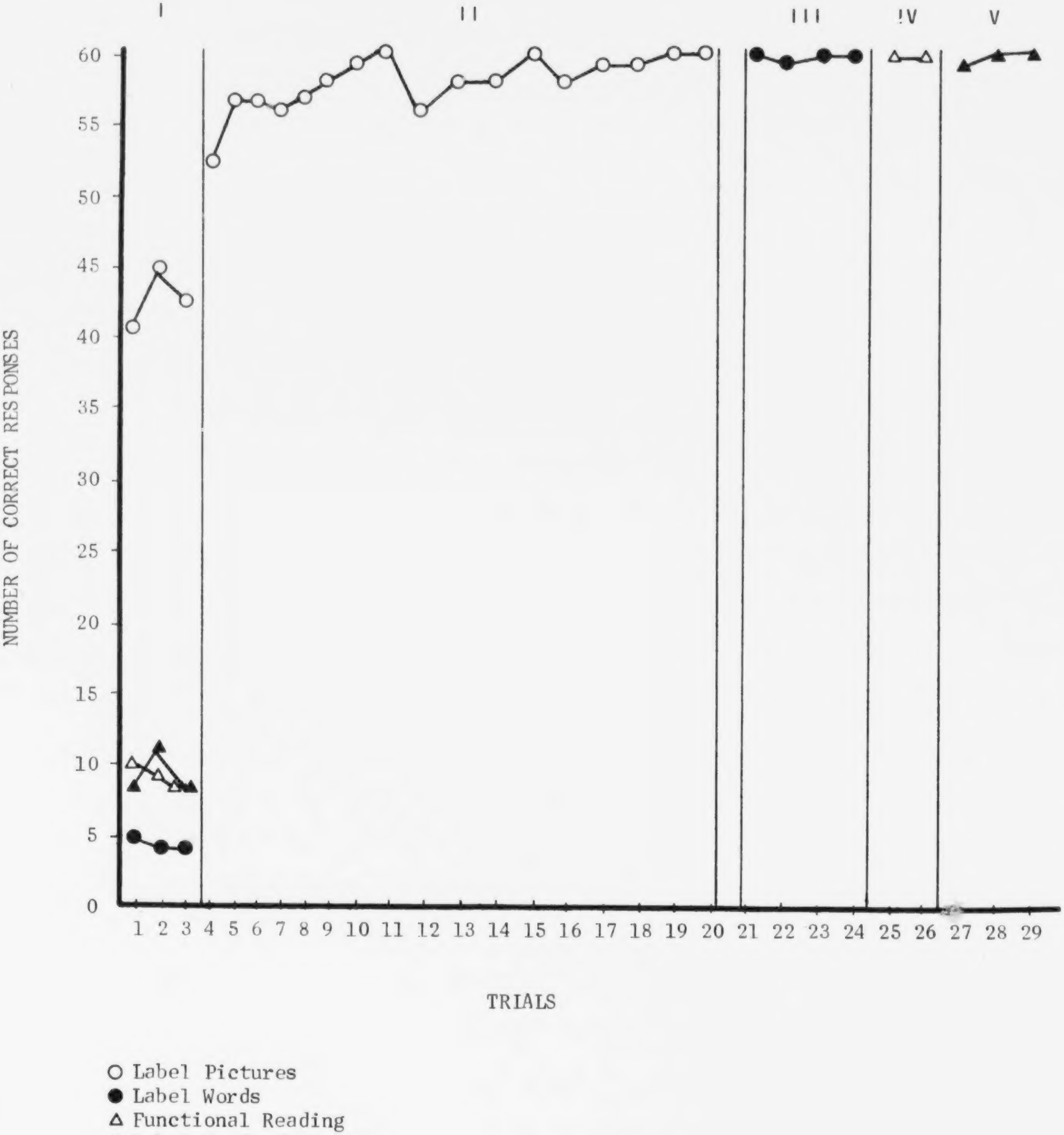
Finally, the traditional modes of managing trainable level persons is changing, at least in many parts of our country. While in the past the overwhelming majority of these persons were either cared for at home or placed in dehumanizing large multipurpose residential facilities, we are now witnessing a shift to more community based and oriented service delivery system (nursing homes, hostels, sheltered workshops, small especially adapted villages, etc.). However, merely changing physical structure or location of the buildings, however important and necessary, will probably have little effect on the life style of these persons. The development and implementation of relevant, viable, and effective instructional programs must accrue concommitantly.

Granted, large institutions do not allow individuals to perform the behaviors in their repertoire; it should also be realized, however, that most trainable level persons will not be able to function in community settings without systematic instruction.

Reference

Brown, L., & Perlmutter, L. Teaching functional reading to trainable level retarded students. Education and Training of the Mentally Retarded, 1971, 6, 74-84.

Figure 1 Number of correct responses 4 Ss made during Phases I baseline; II teaching Ss to label food pictures; III review of Ss ability to label word cards; IV teaching functional reading; V teaching Ss to read menus.


I
II
III
IV
V
NUMBER OF CORRECT RESPONSES
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20
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35
40
45
50
55
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TRIALS
○ Label Pictures
● Label Words
△ Functional Reading
▲ Label Words from Menu

Teaching Sight-Words To Trainable Children Via Chart Stories

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Ever since a 1969 sight word study (Brown, Hermanson, Klemme, Haubrich, & Ora, 1969) verified empirically that trainable children can learn to read sight words, an avalanche of similar programs have been implemented. Each successive program has improved on the one before it. However, though the successes have been impressive several weaknesses are inherent in all of the programs. Several limitations are as follows:

1) spontaneity of responding is restricted;
2) commonality of word lists between classes and programs is unlikely;
3) word attack skills, beyond sight recognition, are not developed;
4) the methodology minimizes an experiential reference for the words, phrases, and sentences;
5) only those students with a high probability of succeeding are included;
6) generalization and retention has not been empirically verified.

It is the purpose of this paper to illustrate a successful reading approach for trainable students which avoids or tends to neutralize the criticisms delineated above.

In this program the students were taught all the words which occur in Harper and Row's preprimer using experiential chart procedures.

METHOD

Students (Ss)

During the academic year just ending all but one of the Ss in the class were included in this reading program. This S was not included because she was not verbal and she enrolled in the class late in the semester. The 9 Ss ranged in CA from 7 to 10, in IQ from 30 to 56, and had been enrolled in school from 2 to 3 years. Medical and educational reports included such diagnoses as Down's Syndrome, severe mental retardation, severe learning disability, hyperactivity, and severe communicative disorder.

Materials

The instructional materials devised for the program consisted of several 24" x 36" pieces of posterboard, an easel, several 3" x 6" postercards, and five thick tipped felt pens of different primary colors. Other materials included the preprimer word list from the Harper and Row Series and several dramatic props, such as a balloon, a doll, a minature swing, toy cards, a box, a hard boiled egg, a trip to a farm, etc. The following is an example of a chart story:

Wagon

Red Wagon
I can ride
Ride Ride Ride

A data sheet was constructed that permitted the recording of each S's ability to label the words prior to and after the program. Teaching was shared by a teacher (T) and 2 student teachers, and was conducted next to and around a circular table in one corner of the classroom.

General Teaching Design

An adaptation of the pre-test post-test measurement design was used. While this design does not allow for the continuous measuring of Ss responses, it does give a very gross indication of each individuals progress. In this program baseline measures of responses to 25 words were obtained. After the words were presented in a chart story and responding was judged to be successful, another baseline measure of the 25 words, in isolation, was obtained.

Teaching Procedures

Two baselines reflecting Ss ability to label the 25 sight words from the preprimer were obtained in the following manner:

T held a card up in front of S and said, "What does this word say?" The response was recorded and the procedure was repeated with S_2, S_3, etc.

Baseline was completed when all Ss had responded to all 25 words. No indication was given that a response was correct or incorrect during any of the baseline trials.

The following teaching procedure was employed during the chart story phase:

1) T arbitrarily chose 3 words from the Harper & Row word list and contrived an experience to dramatize these words.

2) T presented the experience to S while verbally modeling, in context, the word, phrases, sentences, which would compose the story.

3) T asked Ss literal questions such as, "What color is the balloon?", in an attempt to elicit the modeled words from them.

4) When Ss answered the literal questions correctly or verbalized a prescribed word, T wrote Ss response on the chart.*

5) When a whole chart story was elicited from Ss T read it aloud.

6) T then said, "I will point to each word and you read. If you read all the words I will give you a big hug."

7) A reading free from any mistakes was followed immediately by a hug and statements such as, "marvelous", "out of sight", "beautiful".

8) If an incorrect reading occurred, T said, "No, this word (these words) says (say) __________". T then pointed to the word (or words) in question and said, "Now you read it again". If correct responding followed, congratulatory statements were made. If correct responding did not occur, modeling was repeated. (At times some Ss had a great deal of trouble with a particular word. On those occasions, modeling was also accompanied by attention to the picture accompanying the story, context cues, and initial consonants). A new chart story was introduced with new words after each S correctly read a story 3 consecutive times.

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*All chart stories corresponded generally to the following format:

one picture represents the story topic.	(Article) Noun Color adjective noun Pronoun (noun) verb noun verb verb verb

When all the words in the first pre-primer were presented via the chart stories, another 2 trial baseline was taken.

The post-test followed the same format as that outlined above for the pre-test.

RESULTS

In a given trial each of the 9 Ss could make from 0 to 25 correct responses to the 25 words. The 9 Ss combined could make from 0 to 225 correct responses.

In the baseline or pre-testing phase (Trials 1 and 2) Ss made 1 and 3 correct responses to the word cards, respectively (See Figure 1).

During the chart story phase, it was observed that prior to each teacher modeled reading the Ss could not read the story. However, at no point did any S take longer than a week to read the story to criterion.

In the final baseline or post-testing phase (Trials 3 and 4) Ss made 200 and 205 correct responses to the words, respectively.

DISCUSSION

The performance of the students as illustrated in Figure I strongly suggests that this reading approach was successful. That is, during the pre-testing the children knew only four of the words in the pre-primer. However, when the chart phase was finished, the students could label 405 (90%) of the words.

The children learned the words in their pre-primer in the context of a story based on a real experience. Thus, some aspects of reading never before found in sight word programs were highlighted. First of all, the teacher reported that rudimentary word attack skills began to appear during chart reading sessions. For example, when the students did know a word they would refer motorically or verbally to the picture on the chart, to the beginning of the phrase or sentence again, or to a previous chart story with the same or a similar word.

Secondly, as the chart phase progressed, it was noted that the children became increasingly spontaneous. For instance, as one student read the sentence, "I like fire trucks", he commented on hearing a fire truck the night before.

Thirdly, the teacher mentioned that retention and generalization were being observed. That is, words presented early in the semester and words which were reviewed only infrequently were retained during the post-test.

Also, when the reading words occurred in other settings, such as in other rooms, or in other subjects, the students immediately labeled the words. Finally, as the data indicates, all but one of the students in the trainable class learned all the words in a standard pre-primer. Moreover, the list of words found in these commercially produced Harper and Row reading series is readily available to any teacher the student would encounter.

The results of this demonstration obviously do not indicate what about the chart phase was effective and what was superfluous, or even that words were learned as a result of the chart phase. There is also no direct record of the students' performances. At present there exists no measurement tool of sufficient flexibility. Hopefully, continued progress in the development of precision teaching and an insightful concern for optimizing all aspects of responding in trainable students will provide this better, more flexible and much needed measurement device.

FIGURE I

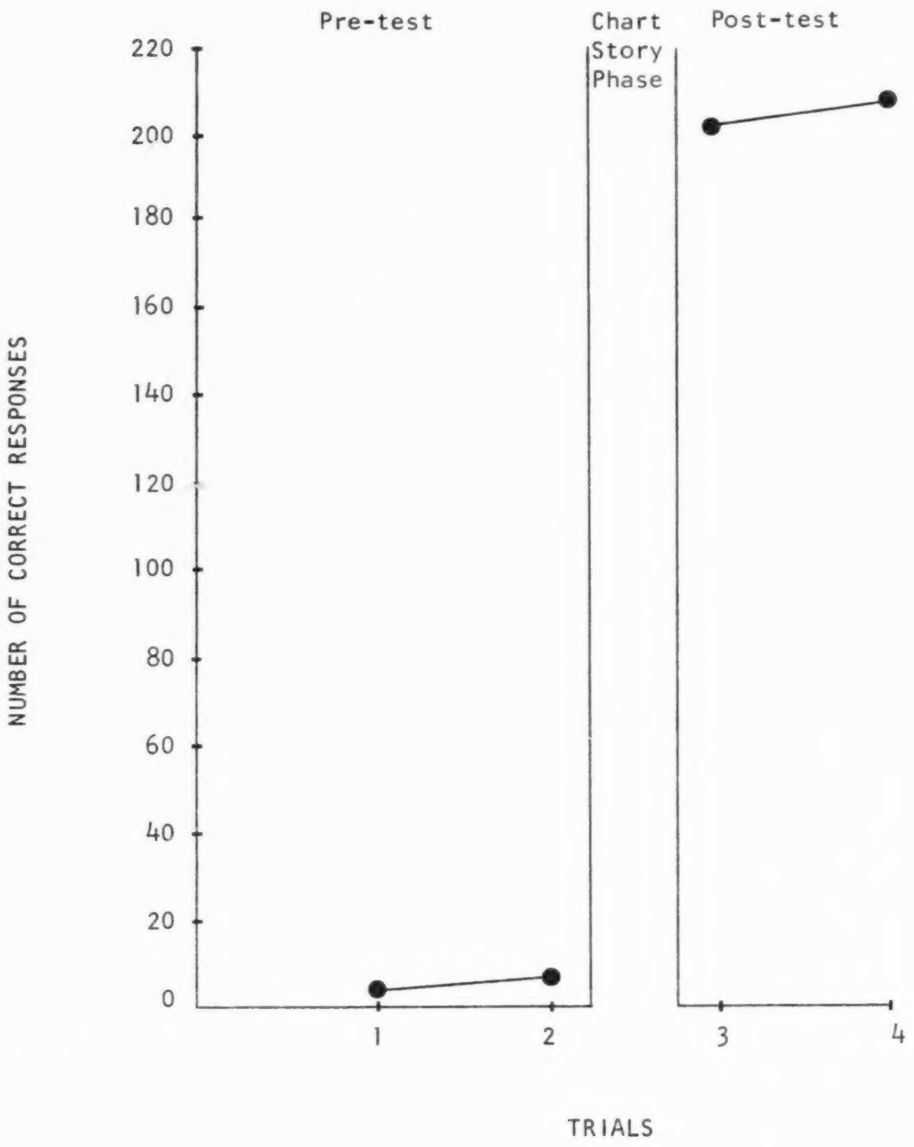

Figure I - Number of correct responses to 25 flashcards during pre-test and post-test.

Use of the "College Bowl" Format to Foster the Acquisition of a Basic Sight Word Vocabulary

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Brown, Van Deventer, Huppler and Sontag (1971) used a game format fashioned after the popular and relatively durable television program "College Bowl" to improve the reading performance of educable level retarded students in a special education classroom. The word performance is emphasized because it was quite obvious to the teachers that the students had the required reading skills in their repertoires but for some reason were not using them. That is, they knew how to read the material presented, but were not performing the behaviors required to read. When the game was introduced the reading performance of the students improved dramatically. It was hypothesized that the game, including the money awards for improved performance, functioned primarily as an incentive to perform reading responses readily available to the students.

The success of the program referred to above led the authors to consider the use of the college bowl game format in an instructional setting concerned primarily with acquisition rather than performance. That is, the following question was posed: Could the game format be used to teach a basic sight word vocabulary to low functioning educable level retarded students?

The reason the teachers were forced to ask the question in the first place was because they were confronted with several adolescent retarded males who did not seem to be able to perform even the most basic reading skills and yet were presumably being prepared for an "occupational adjustment" program at the local high school. As minimal reading skills are mandatory prerequisites in almost

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any occupational endeavor it seemed imperative that the teachers devise an instructional program that imparted some of these skills as soon as possible.

METHOD

Students (Ss)

Although eight Ss were included in this program, data will be presented on only two of the Ss.

S_1's chronological age was 15-0 years, his IQ score was 79 and he had been enrolled in public schools for 9 years. The following descriptions were extracted from his cumulative folder: "can't follow directions," "hyperactive," "easily distracted by others," "left-right confusion," and "dyslexic."

S_2's chronological age was 18-2, his IQ score was 60, and he had been enrolled in public schools for 12 years. The following descriptions were taken from his cumulative folder: "poor reading skills," "distractibility," "short attention span," "poor memory," "epileptic," and "mixed motor seizure disorder".

The remaining six Ss, most of whom had higher level reading skills, were in the program to improve socialization skills as well as improve reading skills.

Materials and Instructional Arrangement

1) 150 flashcards each with a printed word taken from the Dolch list (See attached word list).
2) Kitchen timer.
3) Data sheets were constructed for the recording of responses Ss made in parts I-IV (See attached sample).
4) Nickels were used as contingent consequences for each member of the winning team.
5) Teacher-constructed sentences and paragraphs (See Sentence Sheets and Paragraph Sheets).

Parts I, II, and III were conducted in a game arrangement. Two teams of 4 members were seated facing each other at both ends of a blackboard. T stood between the two teams with her back to the blackboard. Parts IV and V were conducted in the classroom with T and Ss 1 and 2 seated at a standard classroom work table.

The entire program was arbitrarily divided into the following 5 parts.

Part I	Direct measures of the students ability to label 150 words selected from the Dolch Word List were obtained.
Part II	The game format was used to teach the students to label words on the lists.
Part III	Periodically, review games were played which involved only the words labeled correctly in the past.
Part IV	The words the students had learned to label were then arranged in sentences and the students were asked to label the sentences.
Part V	The students were asked to read short paragraphs and verbally report the content.

Procedures

Part I Baseline measures of the ability of Ss 1 and 2 to label the 150 words was obtained in the following manner.

Ss and T were seated around the table. T presented one flashcard with a printed word to S_1 and said, "What is this word?" After S_1 responded, the response was scored for correctness or incorrectness and recorded on a data sheet. A second card was then presented to S_2 and T said, "What is this word?" After S_2 responded, the response was scored and recorded on a data sheet. A third card was presented to S_3 etc., until each S had an opportunity to respond to each of the 150 flashcards on three occasions.

Part II Teaching game. Prior to the start of each class each of the 8 members of the class blindly selected one of 8 pieces of paper from a cup. Four of the pieces of paper contained the letter A and four contained the letter B. Three 10 min. games were played in a 45 min. class period and new teams were selected after each game. Players on teams A and B were called players 1, 2, 3, 4, and 5, 6, 7, and 8 respectively.

Twelve words were used in each game. The same 12 words were used for all

3 games on a given day. After the timer had been set for 10 minutes, T asked Player 1 (Team A), to label the first word. Player 1 was allowed 15 seconds to respond. If he answered correctly, he was praised and one point was recorded for Team 1 on the backboard. The second printed word was then presented to Player 5 (Team B).

If Player 1 (Team A), did not respond correctly, Player 5 (Team B) was then given the opportunity to label the printed word. If Player 5 answered correctly, Team B received one point. If Player 5 did not respond correctly, Player 2, Team A was asked to label the same word. When the timer rang, the points for each team were counted and the players from the winning team each received a nickel.

A word was dropped from the game and a new word added after each of the 8 Ss had successfully labeled that word on three consecutive occasions. New words were randomly selected from those not in the game previously.

Part III Review games. After Ss 1 and 2 had learned the labels of over 50 words review games were scheduled on Fridays. The review consisted of using all the words Ss had learned (reached criterion). The rules of the review games were exactly those of the teaching game except that the words were presented in a random fashion rather than in sets of 12.

Part IV Labeling sentences. To further strengthen Ss' recognition of the words and to place the words in a setting other than a flashcard drill, sentences were constructed by T (See Sentence Worksheets). These sentences were composed of words that had been, or were being, used in the game along with occasional new words. The procedures used to teach Ss to label the sentences were essentially those used to teach the labeling of words. That is, T presented a sentence worksheet to Ss 1 and 2 and instructed S_1 to,"Read the first sentence." If S_1 labeled the words in the sentence correctly, T congratulated him and asked S_2 to read the words in the next sentence etc.

If an S did not label the words in the sentence correctly T modeled the correct responses and instructed S to match the responses modeled. This procedure was followed until Ss 1 and 2 labeled all the sentences on the Sentence Worksheets.

Part V In Part V sentences were combined to form paragraphs that attempted to communicate specific themes (e.g. see attached paragraphs). The procedures used to teach Ss to read the paragraphs were as follows.

T presented Ss with a Paragraph Sheet and said to S_1, "Read the story." If S_1 labeled the words in the paragraph correctly T then asked a series of questions. If S_1 answered the questions (verbally) he was congratulated and S_2 was asked to read a second paragraph. If S_1 made an error while reading the sentences, T said, "Stop, read that sentence again." When S_1 read the sentence correctly T said, "Now, read on." If S_1 did not answer the questions correctly, T pointed to the sentence that contained the answer, asked S to read that sentence and then asked the question again. This procedure was sufficient to extract the correct verbal responses.

RESULTS

Part I During the baseline period (Figures 1 and 2, Day 1), Ss 1 and 2 were given three opportunities to label each of the 150 words. S_1 labeled 3 of the 150 words correctly on three consecutive occasions and S_2 labeled 16 of the 150 words correctly on three consecutive occasions.

Part II During the teaching game a word was considered learned if it was correctly labeled on three consecutive presentations. When a word was learned it was removed from the game and a new word was introduced. Thus, the game always included 12 words. As can be discerned from Figures 1 and 2, Ss 1 and 2 gradually reached criterion on all 150 of the words.

Part III The review games were all the words Ss 1 and 2 had learned prior to a particular review game. It should be noted that in any review game more words were included than either S_1 or S_2 individually had learned in that Ss reached criterion on different words during the teaching game. As can be discerned from Figures 1 and 2, Ss 1 and 2 the total number of words in the review games gradually increased until at trial 50 all 150 of the words were included. In trial 50, $\underline{S}_1$ labeled 145 of the 150 words correctly and $\underline{S}_2$ labeled 147 of the 150 words correctly.

Parts IV and V During Parts IV and V the responses of Ss were recorded, but will not be presented graphically here. Perhaps it is sufficient to say that the two Ss learned to label the sentences on the sentence worksheets and learned to label and verbally answer the questions pertaining to the paragraphs.

DISCUSSION

Figure 1 clearly shows that both $\underline{S}_1$ and $\underline{S}_2$ entered this program with an extremely minimal sight word vocabulary after 9 and 12 years of public school, respectively. However, after 50 days of instruction, $\underline{S}_1$ and $\underline{S}_2$ were not only labeling the 150 words correctly, but were also reading and comprehending sentences and paragraphs composed from those words.

Although the results of the program might seem dramatic, the problem of teaching the students to read to such a degree as to function in a community vocational setting still remains. Obviously, the problem will not be resolved by playing these or other classroom games. More longitudinal and comprehensive reading programs which include phonetic and other word attack skills will be required. However, it is indeed unfortunate that such programs were not initiated earlier in the school careers of these students.

Finally, in the initial stages of the program it was assumed that the opportunity to earn money as well as the inherent peer pressure would be the primary incentives for sustained effort. It is doubtful that this was the case. In the view of the teachers the mere fact that the students were learning to read after so many years of frustration and failure, and the concomitant personal satisfaction were the major reasons for continued enthusiasm and progress.

FIGURE 1

$\underline{S}_1$

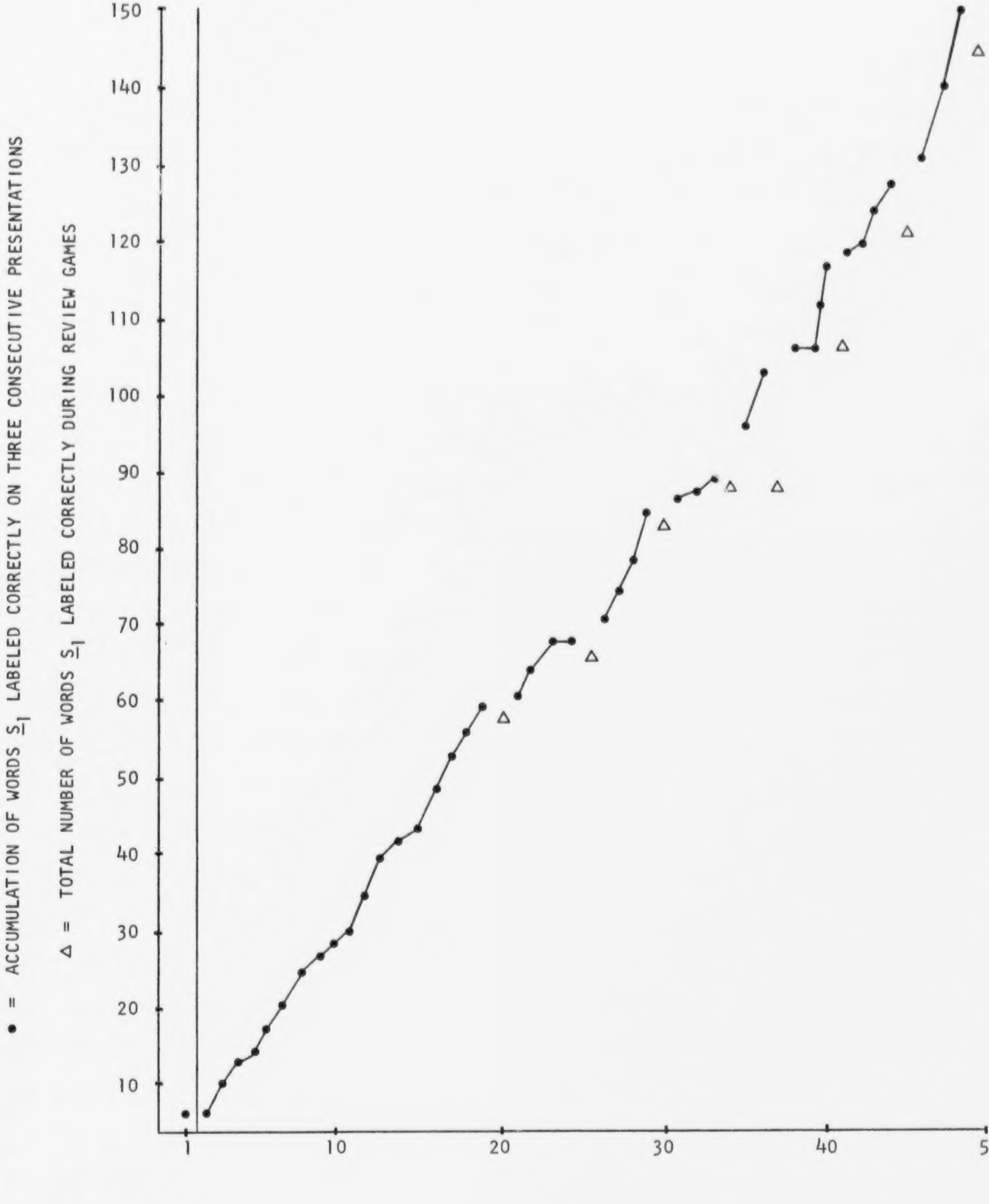
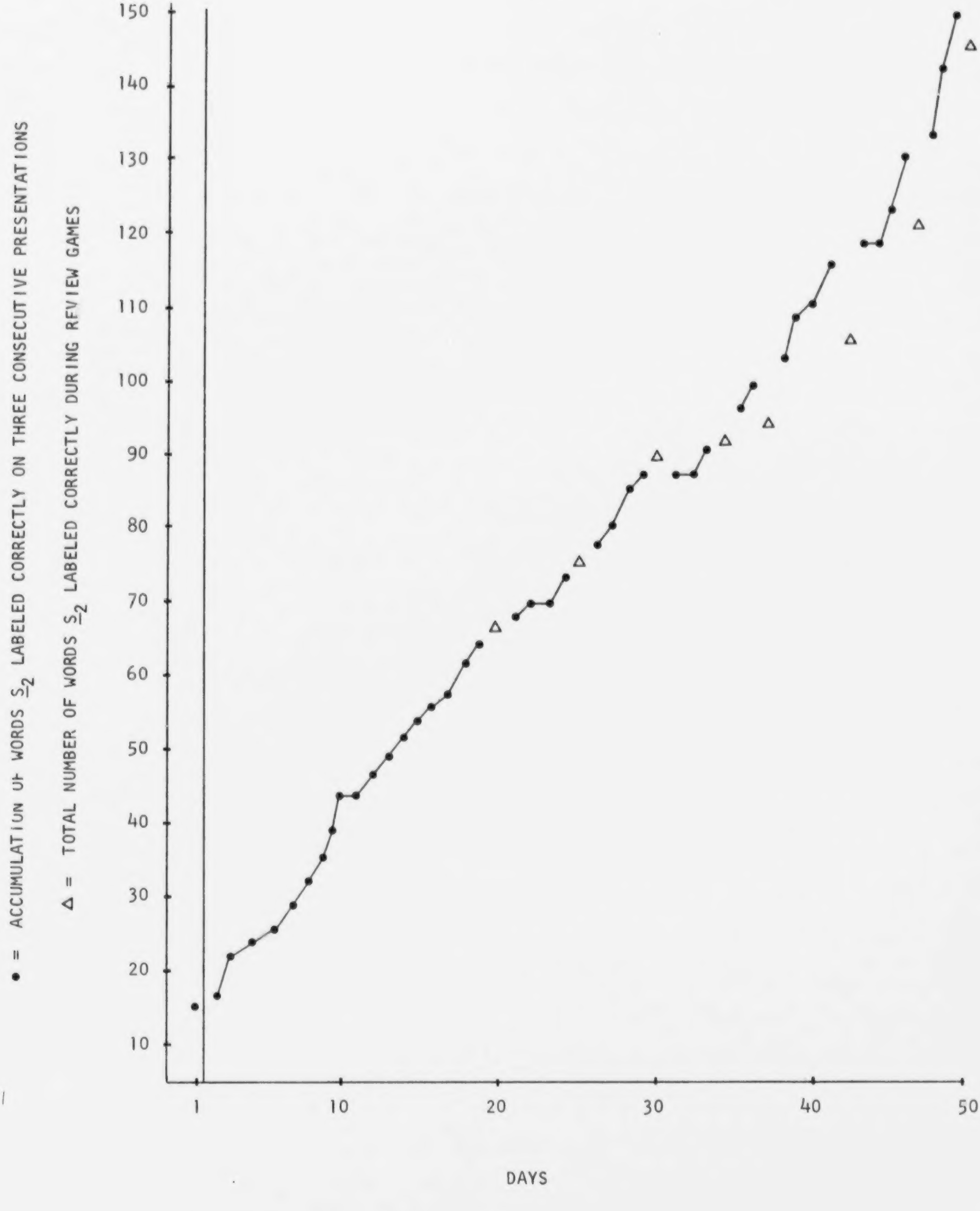


FIGURE 11

$\underline{S}_2$



WORD LIST

funny
came
they
ask
her
pot
because
off
us
better
got
only
here
have
there
any
his
round
best
or
use
bring
grow
own
it
must

under
how
some
both
pull
very
carry
on
application
write
name
date
address
in
your
who
age
my
find
new
pick
hold
could
pink
take
call

right
wash
clean
hurt
seven
where
was
said
every
just
thank
sing
cut
which
no
am
know
saw
please
kind
show
keep
an

give
three
work
done
made
why
would
over
let
going
want
went
drink
job
has
were
when
today
small
try
much
those
their
again
never
live

ate
fly
so
but
may
walk
say
from
many
twelve
ran
with
does
what
this
white
laugh
start
together
fall
long
think
goes
myself
light
sleep

sit
warm
gave
then
had
once
first
found
always
wish
these
upon
draw
eight
money
need
home
study
friend
thing
all
high
school

SAMPLE DATA SHEET

Date

Game # ___

	WORDS										
S1											
S2											
S3											
S4											
S5											
S6											
S7											
S8											

Game # ___

S1											
S2											
S3											
S4											
S5											
S6											
S7											
S8											

SENTENCE SHEET

They came.

They are funny.

They run and jump.

You and I came.

You and I are funny.

You and I run and jump.

We came.

We are funny.

We run and jump.

SENTENCE SHEET

1. The pot is round.

2. It is funny.

3. It is blue and red.

4. It is for us.

5. It is the only pot here.

6. They came to see his pot.

7. Ask her for the pot.

8. You came to see the pot.

SENTENCE SHEET

1. Where does one find any application?
2. I want to ask her for the pink application.
3. Which application is the right one for us?
4. Take the pink or blue application.
5. I have my very own application.
6. You must write your name, date, and age on every application.
7. Take your address off the application.
8. Both of us want to thank you for the applications.
9. He could pick his best application.
10. Call and ask for seven new applications.
11. He was just there for an application.
12. Only some came and got applications.
13. If you sing, write in on the application.
14. What is under the pot?
15. Steve, carry or pull the pot here.
16. Mike, hold the pot and wash it.
17. Clean the pot and bring it here.
18. Find and use the funny pot.

19. It grows better in the round pot.

20. They said they got cut on the pot.

21. Who got hurt because of the pot?

22. How hurt was he?

23. How many applications do you have?

24. Why does Steve have twelve applications?

25. When your work is done, go get an application from Donna.

26. Give three applications with your name on them to Mike.

27. Would you please let me have one application?

28. Thank you for going to get my application, Steve.

29. Show her the kind of application you want.

SENTENCE SHEET

An Application

Ask her for an application.

Steve came and got his application.

Both Steve and Mike have applications.

Mike must write his name on an application.

Bring an application here.

They have only one application for us.

His very own application is here.

Steve must use his own application.

PARAGRAPH SHEET

Mike and Steve want to work. They were going to try and find jobs today. Everywhere they would go they were asked to take an application and write their name, age, and address. Mr. Jones gave Mike and Steve all kinds of applications. They could keep the blue applications and give the white ones to Mr. Jones. They had to say if they had a job and when they worked. They said they never had jobs. Mr. Jones was pleased with them. He said he would call them if he finds jobs which they could do.

East High School

Mike, Steve, and Joe are going to East High School. Why are they going to East? They are going to East because they showed us they can work. They know and try to do what is right. They want to go there and try to do better work. They want to find jobs. Mrs. Van Deventer and Donna are very pleased with their work.

PARAGRAPH SHEET

FRIENDS

What is a friend? A friend is one who is kind to us. We do fun things with a friend. We might even study with a friend. We can not buy a friend with money. We wish a friend is always there when we need him. We have many friends at Badger. We will make more friends at East High School.

A Sequential Procedure for Teaching Simple Reading Skills to Trainable Retarded Students

Mimi Domnie and Tom Bellamy

Madison Public Schools

In the "whole word" approach to teaching reading, a student is presented with printed material (a word, sentence, etc.) and must correctly read the material to obtain presumed reinforcement (Staats and Butterfield, 1968). This is consistent with laboratory established learning principles which relate behavior occurrence to the provision of contingent positive reinforcement and the development of discriminative stimulus control (Holland and Skinner, 1961).

The whole word approach has been slightly modified in reading instruction with trainable retarded students, and considerable data has resulted. Brown and Perlmutter (1971) defined "functional reading" as both a verbal and an observable motor response to a printed material. That is, in addition to labeling words as in the whole word approach, students were asked to point to an object or picture or perform an action that demonstrated some identification or comprehension of the printed material. Several small groups of trainable students have developed functional reading skills in short term teaching programs. Different groups have learned to read individual words (Brown, Hermanson, Klemme, Haubrich and Ora, 1970), prepositional phrases (Brown and Perlmutter, 1971), adjective-noun combinations (Brown, Jones, Troccolo, Heiser, Bellamy and Sontag, 1972), and action verbs (Brown, Huppler, Pierce and Sontag, 1972). Success in these short-term programs suggests that it may be too conservative to expect trainable students to read only basic safety words after extended schooling (Kirk, 1972). However, teaching procedures which were successful in these programs have not yet been applied to long-term reading instruction of a single group of trainable students. The reading skills that these students might acquire in such long-term instruction is still uncertain.

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The procedures reported here are an application of the functional reading approach to the reading instruction of a small group of trainable students during an entire school year. At the beginning of the year the students could read color names, but little else. A sequence of reading tasks was constructed which began with this skill level and gradually added new vocabulary items and new sentence elements. The instructional program progressed through the following steps:

Phase I - Discrimination and sight word skills.

A. Baseline all tasks in Phase I
B. Teach labeling colors and selecting matching samples (Task 1)
C. Teach labeling objects and selecting matching samples (Task 2)
D. Teach labeling color words and selecting corresponding colors (Task 3)
E. Teach labeling object words and selecting corresponding objects (Task 4)
F. Teach labeling object words with articles and selecting corresponding objects (Task 5)

Phase II - Reading patterned noun phrases with all possible color object combinations (Task 6)

A. Baseline all sets
B. Teach Set 1
C. Post-test Set 1, Pre-test Set 2
D. Teach Set 2
E. Post-test Set 2, Pre-test Set 3
F. Teach Set 3
G. Post-test Set 3, Pre-test Set 4
H. Teach Set 4
I. Post-test Set 4, Pre-test Set 5
J. Teach Set 5
K. Post-test all sets

Phase III - Reading patterned sentences with all possible color-object combinations (Task 7)

A. Baseline all sets
B. Teach Set 1
C. Post-test all sets

Phase IV - Reading patterned sentences with new elements

A. Baseline all tasks
B. Teach reading patterned sentences with plural predicate adjectives (Task 8)
C. Post-test Task 8; Pre-test Task 9
D. Teach reading patterned sentences with plural subjects (Task 9)
E. Post-test Task 9; Pre-test Task 10
F. Teach reading patterned sentences with polar opposites as predicate adjectives (Task 10)

G. Post-test Task 10; Pre-test Task 11
H. Teach reading patterened sentences that include two attributes (Task 11)
I. Post-test Task 11; Pre-test Task 12
J. Teach reading patterned sentences that include locative prepositional phrases (Task 12)

Phase V - Reading non-patterned sentences containing new nouns and verbs

A. Baseline Task 13
B. Teach reading non-patterned sentences containing new modifiers
C. Post-test Task 13; Pre-test Task 14
D. Teach reading non-patterned sentences containing new verbs and nouns

METHODS

Students

Students (Ss) were three Down's Syndrome children who ranged in age from 10-0 to 12-4 ($\bar{X}$=11-3) and in IQ (Stanford-Binet) from 37 to 47 ($\bar{X}$=42), and who had been enrolled in public school programs for the trainable retarded from 4 to 6 years ($\bar{X}$=5.0).

Materials

Instructional materials were made by the teacher. These included flashcards, sample cards, poster boards, a display box, data sheets, and numerous sizes and colors of pencils, balls, crayons, paper party cups and balloons. In addition, edibles, including candies and popcorn were used as incentives.

Flashcards were used to present reading materials, objects and colors which Ss were expected to label. Flashcards were constructed of 3" x 5" white index cards in Phase I and 3" x 5" manilla cards in Phases II-IV. Specific materials presented on the flashcards will be clarified as individual tasks are presented below.

Display cards were used to display objects to which Ss pointed after labeling flashcards. Display cards were constructed of 3" x 5" white index cards to which a variety of pictures, objects, and colors were attached. Specific materials displayed on these cards will be clarified as individual tasks are presented below.

Display cards were attached to a Display Box in Phase I and to 2' x 3' sheets of posterboard in Phases II-V. The Display Box was a 15" x 3" x 1" wooden box which was divided into 5 components. During Phase I, display cards were attached to the hinged lids over each compartment. Edibles could be placed in the compartments.

Daily responding was recorded on mimeographed data sheets, which were constructed in a grid with Ss names along one margin and the responses required in a task along the other. In addition, a frequency polygon, showing the number of correct responses made by the group across trials, was maintained by T and displayed on the classroom wall.

TEACHING PROCEDURE

Baseline and Testing

Ss performance on tasks in each phase of the program was assessed prior to teaching the phase. Two baseline trials were conducted in which each S responded to all instructional cues in each task. Assessment was conducted in a group setting with Ss alternating turns. T presented S with an instructional cue and allowed S to respond without assistance. The response was recorded as correct when S labeled the flashcard and pointed to the corresponding display card. No indication was given S of the accuracy of the response. A different instructional cue was then presented to the next S. All subsequent testing trials were conducted in the same manner.

Teaching

As during baseline, teaching was conducted in a group setting, with Ss alternating turns. T presented S with an instructional cue and allowed S to respond without assistance. The response was recorded as correct when both the labeling and pointing responses were appropriate, and as incorrect when either the labeling or pointing response was missed. The accuracy of each response during teaching determined the consequences which S received. When S responded correctly, he immediately received applause and praise ("tremendous", "fantastic" "good reading", etc.) from T and other Ss. In addition, edibles and tokens which would be exchanged for toys were given after correct responses. Every effort was made to consequate correct responses in a manner which appeared enjoyable to individual Ss.

When S responded incorrectly the teaching procedures used depended on the specific error which occurred. Two kinds of errors were possible in each task. S could incorrectly label the flashcard or point to the wrong display card. If S incorrectly labeled the flashcard, T modeled the correct response (e.g., read the part of the card that was missed) and asked S to read the card once more. Modeling procedures were repeated when necessary for S to read the card correctly. If S pointed to the wrong display card, T first asked him to re-read the flashcard and said, "Try again". If S still pointed to the wrong display card, T modeled the correct response (i.e., pointed to the correct card) and then asked S to read the flashcard once more and point to the correct display card. Ss always pointed to the correct display card after T's model.

Task 1 - Labeling colors and selecting matching samples.

Attached to the flashcards were 2" x 2" squares of colored construction paper (red, yellow, blue, green, orange). Attached to the display cards were 3" x 3" squares of identical colored construction paper.

T presented S with a flashcard and instructed him, "What color is this? Point to the one like it." S must label the color and touch the matching display card.

Task 2 - Labeling objects and selecting matching samples.

Attached to the five flashcards were five objects: a pencil, a ball, a crayon, a cup and a balloon. Attached to five display cards were one each of the same five objects.

T presented S with a flashcard and instructed him, "What is this? Point to the one like it." S must label the object and touch the matching display card.

Task 3 - Labeling color words and selecting corresponding colors.

Printed on the flashcards were the five color labels ("red," "yellow", "blue", "green", and "orange"). Attached to five display cards were one each of the same five colors.

T presented S with a flashcard and instructed him, "What does this say? Point to the one like it." S must label the five flashcards and touch the corresponding display card.

Task 4 - Labeling object words and selecting corresponding objects.

Printed on the flashcards were the five object labels ("pencil", "ball", "crayon", "cup", and "balloon"). Attached to five display cards were one each of the same five objects. T presented S with a flashcard and instructed him, "What does this say? Point to the one like it." S must label the five flashcards and touch the corresponding display cards.

Task 5 - Labeling object words with articles and selecting corresponding objects.

Printed on the flashcards were the five object labels plus the article "the" ("the ball", "the balloon", "the pencil", "the crayon", and "the cup"). Attached to the five display cards were one each of the same five objects. T presented S with a flashcard and instructed him, "What does this say? Point to the one like it." S must label the five flashcards and touch the corresponding display card.

Task 6 - Reading patterned noun phrases with all possible color object combinations.

Printed on the flashcards were all 25 possible noun phrases. These were assigned to the following 5 sets of 5 flashcards. Set 1 - "the blue balloon", "the yellow crayon", "the orange cup", "the red ball", "the green pencil"; Set 2 - "the green ball", "the blue pencil", "the yellow cup", "the red balloon", "the orange crayon"; Set 3 - "the orange balloon", "the red pencil", "the blue crayon", "the yellow ball", "the green cup"; Set 4 - "the red cup", "the green crayon", "the yellow balloon", "the blue ball", "the orange pencil"; Set 5 - "the orange ball", "the yellow pencil", "the green balloon", "the blue cup", "the red crayon". Attached to the display cards were objects of the same 25 possible combinations. T presented S with a flashcard and instructed him, "What does this say? Point to the one like it." S must label all words on the flashcard and touch the corresponding display card.

Task 7 - Reading patterned sentences with all possible color-object combinations.

Printed on the flashcards were all 25 possible patterned sentences. These were assigned to the following 5 sets of 5 flashcards: Set 1: the pencil is green, the cup is orange, the ball is red, the balloon is blue, the crayon is yellow; Set 2: the crayon is orange, the balloon is red, the ball is green, the pencil is blue, the cup is yellow; Set 3: the crayon is blue, the cup is green, the balloon is orange, the pencil is red, the ball is yellow; Set 4: the ball is blue, the crayon is green, the balloon is yellow, the pencil is orange, the cup is red; Set 5: the cup is blue; the ball is orange, the crayon is red, the pencil is yellow, the balloon is green.

Attached to the display cards were objects of the same 25 possible combinations. T presented S with a flashcard and instructed him, "What does this say? Point to the one like it." S must label all words on the flashcard and touch the corresponding display card.

Task 8 - Reading patterned sentences with plural predicate adjectives.

Printed on the 5 flashcards were the following patterned sentences: the ball is yellow and blue, the crayon is red and green, the balloon is orange and blue, the pencil is green and yellow, the cup is red and orange. Attached to the display cards were object representations of the sentence flashcards. T presented S with a flashcard and instructed him, "What does this say? Point to the one like it." S must label all the words on the flashcard and touch the corresponding display card.

Task 9 - Reading patterned sentences with plural subjects.

Printed on the 5 flashcards were the following patterned sentences: the ball and balloon are yellow, the cup and crayon are red, the pencil and ball are green, the crayon and balloon are orange, the pencil and cup are blue. Attached to the display cards were the object representations of the sentence flashcards. T presented S with a flashcard and instructed him, "What does this say? Point to the one like it." S must label all the words on the flashcard and touch the corresponding display card.

Task 10 - Reading patterned sentences with polar opposites as predicate adjectives.

Printed on the 5 flashcards were the following patterned sentences: the pencil is long, the cup is big, the balloon is big, the ball is little, the crayon is short. Attached to the display cards were object representations of the sentence flashcards. T presented S with a flashcard and instructed him, "What does this say? Point to the one like it." S must label all the words on the flashcard and touch the corresponding display card.

Task 11 - Reading patterned sentences that include two attributes.

Printed on the 5 flashcards were the following patterned sentences: the pencil is short, the short pencil is blue; the balloon is red, the red balloon is little; the ball is big, the big ball is green; the crayon is long, the long crayon is orange; the cup is yellow, the yellow cup is little. Attached to the display cards were object representations of the sentence flashcards. T presented S with a flashcard and instructed him, "What does this say? Point to the one like it." S must label all the words on the flashcard and touch the corresponding display card.

Task 12 - Reading patterned sentences that include locative prepositional phrases.

Printed on the 5 flashcards were the following patterned sentences: the pencil is red, the red pencil is in the cup; the balloon is big, the big balloon is under the crayon; the crayon is orange, the orange crayon is next to the ball; the ball is little, the little ball is beside the pencil; the cup is green, the green cup is on top of the balloon. Attached to the display cards were object representations of the sentence flashcards. _T_ presented _S_ with a flashcard and instructed him, "What does this say? Point to the one like it." _S_ must label all the words on the flashcard and touch the corresponding display card.

Task 13 - Reading non-patterned sentences containing new modifiers.

Printed on the 5 flashcards were the following non-patterned sentences: three blue cups are on top of the balloon; a little balloon is not yellow; one red crayon is not long; two green cups are little; the red pencil is not in the cup. Attached to the display cards were object representations of the sentence flashcards. _T_ presented _S_ with a flashcard and instructed him, "What does this say? Point to the one like it." _S_ must label all the words on the flashcard and touch the corresponding display card.

Task 14 - Reading non-patterned sentences containing new verbs and nouns.

Printed on 5 flashcards were the following non-patterned sentences: the green balloon is floating over the pencil; the yellow bird is sleeping on top of the flower; the orange ball is smiling beside the crayon; the red pencil is falling in the cup; the blue crayon is walking under the cup. Attached to the display cards were pictorial representations of the sentence flashcards. _T_ presented _S_ with a flashcard and instructed him, "What does this say? Point to the one like it." _S_ must label all the words on the flashcard and touch the corresponding display card.

RESULTS

The program involved 256 teaching trials conducted in daily 45 minute periods during an entire school year. Each S could make from 0-5 correct responses to a task, so the number of correct responses made by the group could range from 0-15 during each trial. Ss progressed through the program by meeting a defined criterion on each task. Criterion performance in Phases I, II, and III was three consecutive perfect trials. Criterion performance in Phases IV and V was two consecutive perfect trials.

The results of Phase I are presented in Figure I. During baseline (Figure I-A) Ss averaged 14.5, 14.5, 14.5, 2, and 0 correct responses to Tasks 1-5 respectively. Criterion performance on Task 1 was met in Trials 3-5 (Figure I-B). Task 2 was taught during Trials 6-12 and criterion was met in Trials 10-12 (Figure I-C). Task 3 was taught during Trials 13-22 and criterion was met in Trials 20-22 (Figure I-D). Task 4 was taught during Trials 23-50 and criterion was met during Trials 48-50 (Figure I-E). Task 5 was taught during trials 51-61 and criterion was met on Trials 47-49.

Phase II

The results of Phase II are presented in Figure II. Baseline measures on all sets of noun phrases were taken prior to any instruction (Figure II-A) and these will be explained as performance on each set is presented below.

Ss averaged 1.0 correct responses to Set 1 during baseline (Trials 1-2) and met criterion after 17 teaching trials (Figure II-B). During post-tests of Set 1 Ss averaged 15.0 correct responses in Trials 80-81 and 14.0 correct responses in Trials 108-109.

Ss averaged 0 correct responses to Set 2 during baseline (Trials 1-2) and 10.0 correct responses during pre-test (Trials 80-81), and then met criterion after 8 teaching trials (Figure II-D). During post-test of Set 2 Ss averaged 14.5 correct responses in Trials 90-91 and 14.5 correct responses in Trials 108-109.

Ss averaged 0.5 correct responses to Set 3 during baseline (Trials 1-2) and 11.5 correct responses during pre-test (Trials 90-91), and then met criterion after 4 teaching trials (Figure II-F). During post-tests of Set 3 Ss averaged 14.5 correct responses in Trials 96-97 and 14.5 correct responses during trials 108-109.

Ss averaged 0.5 correct responses to Set 4 during baseline (Trials 1-2) and 12.5 correct responses during pre-test (Trials 96-97), and then met criterion after 5 teaching trials (Figure II-H). During post-tests Ss averaged 14.0 correct responses in Trials 103-104 and 13.5 correct responses in Trials 108-109.

Ss averaged 1.5 correct responses to Set 5 during baseline (Trials 1-2) and 13.0 correct responses during pre-test (Trials 1-2) and then met criterion after 3 teaching trials (Figure II-J). During post-tests (Trials 108-109), Ss averaged 15.0 correct responses.

Phase III

The results of Phase III are presented in Figure III. During baseline (Trials 1-2), Ss made no correct responses. Set 1 was taught during Trials 110-116 (Figure III-B). Criterion performance was met in Trials 114-116. During post-test Ss averaged 14.5, 14, 14, 13.5, and 14 correct responses to Sets 1-5 respectively. Inasmuch as 90% accuracy on Sets 2-5 was recorded during post-tests (Figure III-C), no further teaching procedures were used.

Phase IV

The results of Phase IV are presented in Figure IV. Baseline measures were taken at the beginning of this phase during Trials 120-121 (Figure IV-A); these will be explained as each task is presented below.

Ss averaged 2.5 correct responses to Task 8 during baseline and then increased from 6 correct responses to 15 in Trials 137-138 (Figure IV-B). Ss averaged 14.5 correct responses to Task 8 during post-test.

Ss averaged 0 correct responses to Task 9 during baseline (Trials 120-121) and 0 correct responses during pre-test (Trials 139-140) and then increased from 13 correct responses in Trial 141 to 15 in Trials 154-155 (Figure IV-D). During post-test of Task 9, Ss averaged 15 correct responses in Trials 136-137 (Figure IV-E).

Ss averaged 0 correct responses to Task 10 during baseline (Trials 120-121) and 0 correct responses during pre-test (Trials 139-140); and then increased from 1 correct response in Trial 158 to 15 in Trials 177-178 (Figure IV-F). During post-test of Task 10, Ss averaged 15 correct responses in Trials 179-180 (Figure IV-G).

Ss averaged 0 correct responses to Task 10 during baseline (Trials 120-121); and 1.0 correct responses during pre-test and then increased from 9 correct responses in Trial 181 to 15 in Trials 197-198 (Figure IV-H). During post-test of Task 11 Ss averaged 15 correct responses in Trials 199-200 (Figure IV-I).

Ss averaged 0 correct responses to Task 12 during baseline (Trials 120-121) and 0 correct responses during pre-test (Trials 199-200) and then increased from 1 correct response in Trial 201 to 15 in Trials 219-220. During post-test of Task 12, Ss averaged 15 correct responses in Trials 221-222 (Figure IV-K).

Phase V

The results of Phase V are presented in Figure V. Baseline measures on each task were taken immediately before teaching that task, and these will be clarified below.

Ss made no correct responses to Task 13 during baseline (Figure V-A) and then increased from 3 correct responses in Trial 225 to 15 in Trials 236-237 (Figure IV-B). Ss responded perfectly to Task 13 during post-test (Figure V-C).

Ss made 0 correct responses to Task 14 during baseline (Figure V-C) and then increased from 1 correct response in Trial 240 to 15 correct responses during 257-258. Ss responded perfectly to Task 14 during post-test (Figure V-E).

DISCUSSION

Instruction objectives were realized in full. The three students learned to read all materials in the sequence.

Instruction in functional reading involves teaching both verbal and observable motor responses to printed materials. As was noted earlier, trainable retarded students have acquired a number of functional reading skills in short term teaching programs. The success of this instruction suggests that the functional reading approach may be equally useful in longer term instruction. Students progressed through a sequence of 13 reading tasks, each of which involved the application of existing reading skills and the introduction of new reading materials.

During one academic year these students have acquired reading skills which seem much more sophisticated than those previously suggested for trainable students. The level of reading skills which these students will acquire before they leave school remains unknown, but the possibilities are indeed exciting. Instruction planned for these students for the coming school year continues the application of a functional reading approach to increasingly advanced reading materials. Students will receive instruction in a sequence of simpie stories which have been designed by the teacher so that records can be maintained of correct pointing responses, correct reading of words learned previously, and correct reading of new words.

The primary purpose of the program was instructional and experimental manipulations, which might allow for more precise evaluations of the procedure were not attempted.

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List of Figures

Figure I Number of correct responses made by Ss during: A) Baseline; B) Teaching Task 1; C) Teaching Task 2; D) Teaching Task 3; E) Teaching Task 4; and F) Teaching Task 5.

Figure II Number of correct responses made by Ss during: A) Baseline; B) Teach Set 1; C) Post-test Set 1, Pre-test Set 2; D) Teach Set 2; E) Post-test Set 2, Pre-test Set 3; F) Teach Set 3; G) Post-test Set 3, Pre-test Set 4; H) Teach Set 4; I) Post-test Set 4, Pre-test Set 5; J) Teach Set 5; and K) Post-test all sets.

Figure III Number of correct responses made by Ss during: A) Baseline; B) Teach Set 1; and C) Post-test all sets.

Figure IV Number of correct responses made by Ss during: A) Baseline; B) Teach Task 8; C) Post-test Task 8, Pre-test Task 9; D) Teach Task 9; E) Post-test Task 9, Pre-test Task 10; F) Teach Task 10; G) Post-test Task 10, Pre-test Task 11; H) Teach Task 11; I) Post-test Task 11, Pre-test Task 12; and J) Teach Task 12.

Figure V Number of correct responses made by Ss during: A) Baseline Task 13; B) Teach Task 13; C) Post-test Task 13, Pre-test Task 14; and D) Teach Task 14.

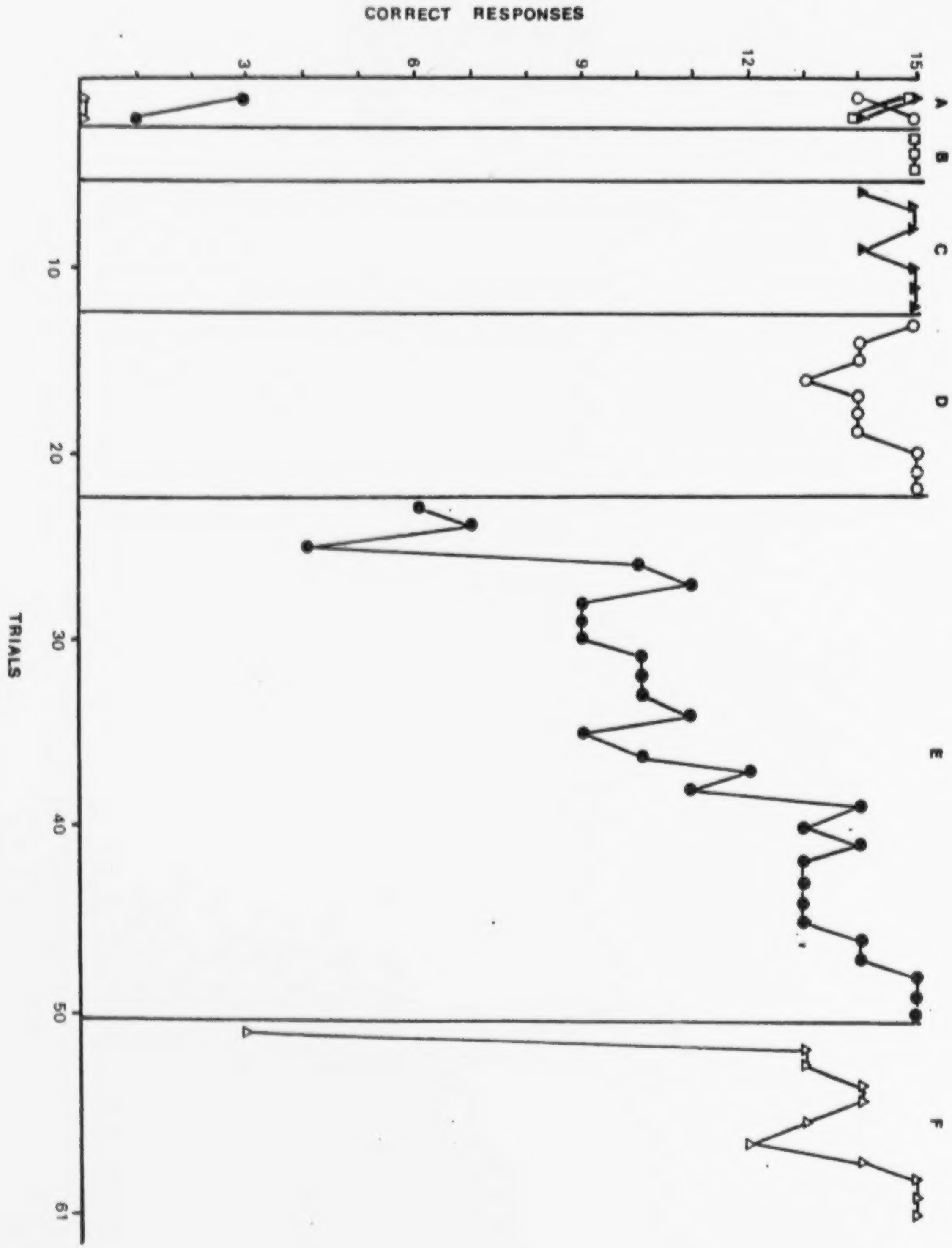


FIGURE I

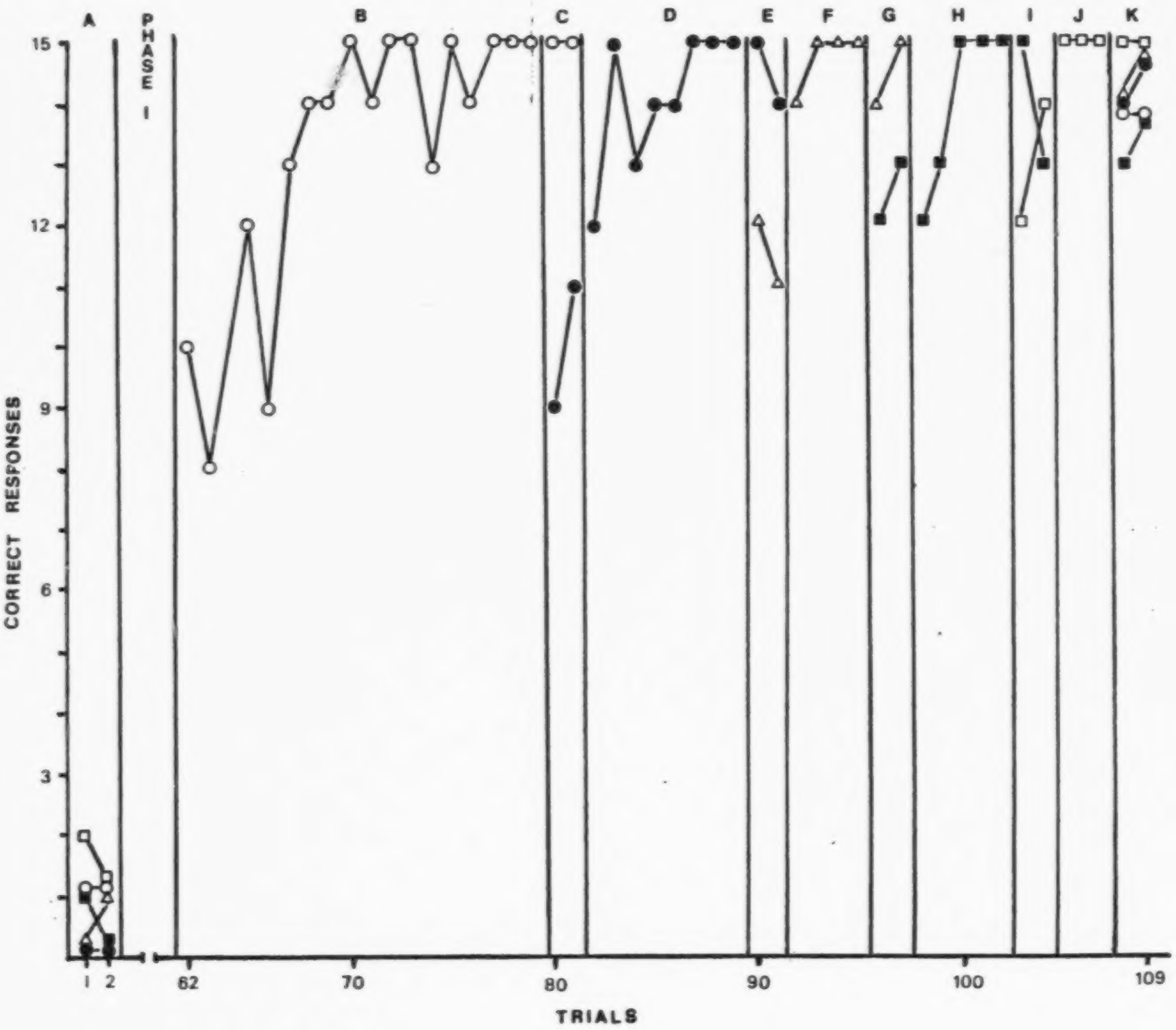

CORRECT RESPONSES
15
12
9
6
3
TRIALS
1 2
62
70
80
90
100
109
A
PHASE I
B
C
D
E
F
G
H
I
J
K

FIGURE II

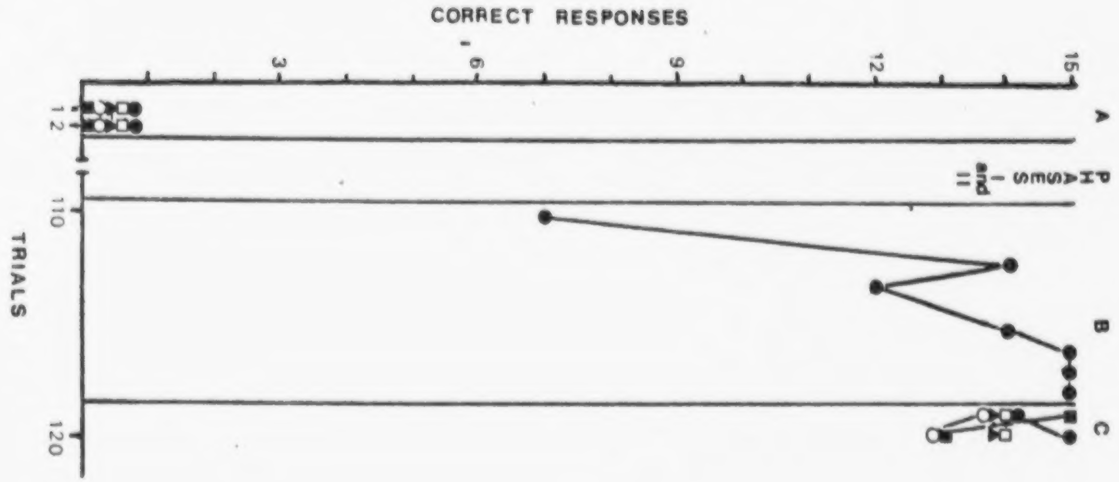

CORRECT RESPONSES
3
6
9
12
15
A
PHASES I and II
B
C
TRIALS
1
2
110
120

FIGURE III

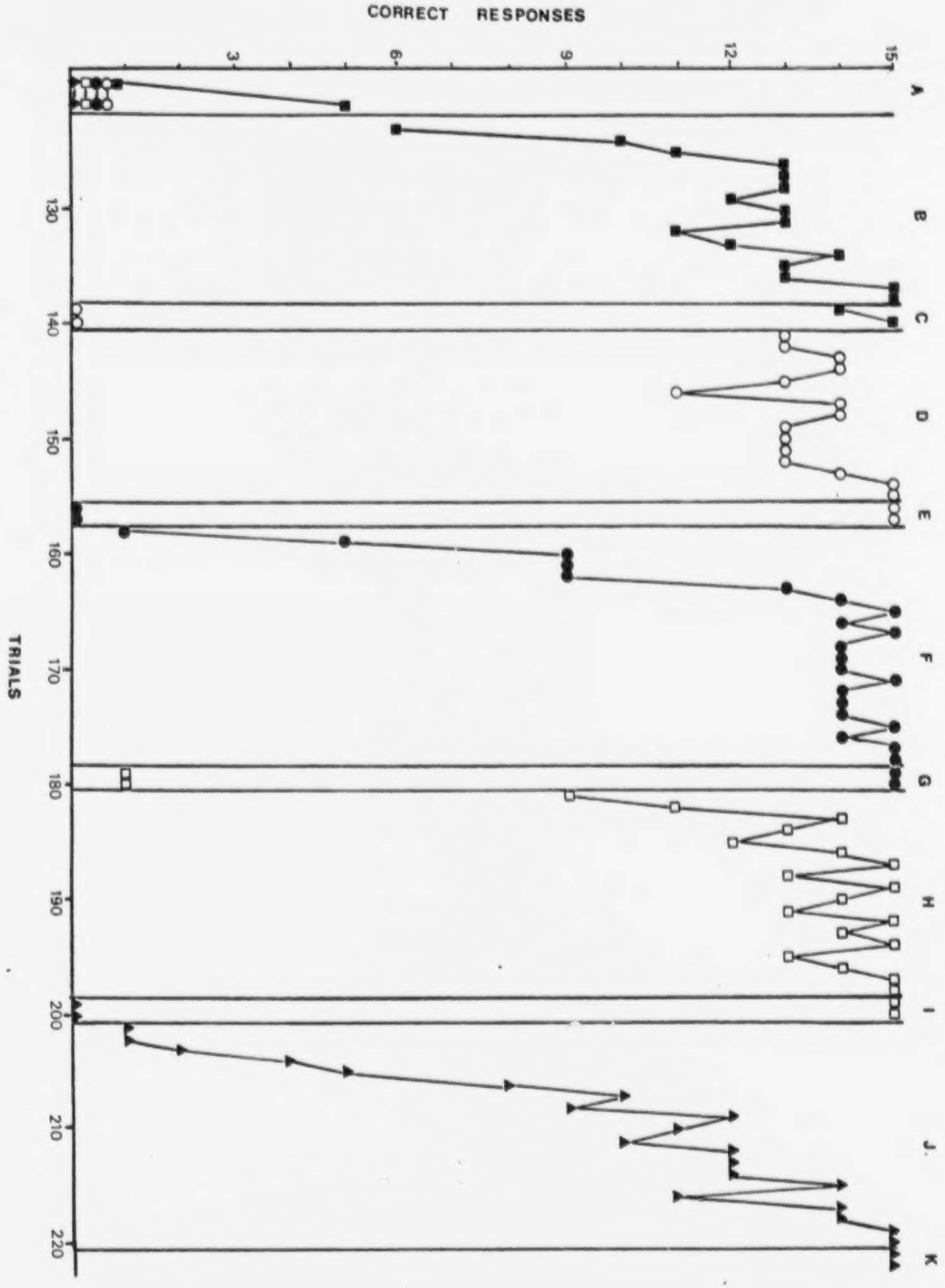
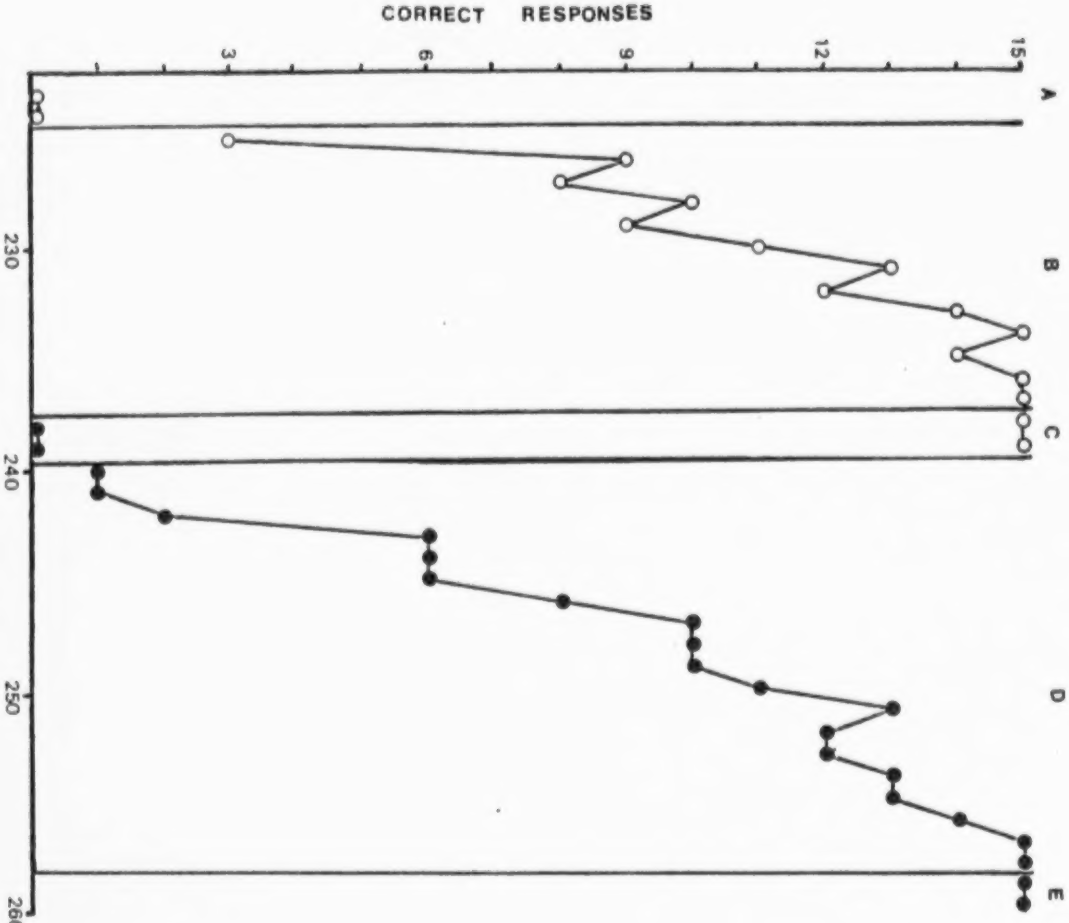

CORRECT RESPONSES
3
6
9
12
15
A
B
C
D
E
F
G
H
I
J.
K
130
140
150
160
170
180
190
200
210
220
TRIALS

FIGURE IV



TRIALS

FIGURE V

TEACHING TRAINABLE LEVEL RETARDED STUDENTS TO COUNT MONEY: TOWARD PERSONAL INDEPENDENCE THROUGH ACADEMIC INSTRUCTION

Tom Bellamy and Kathleen Laffin

Madison Public Schools and the University of Wisconsin

Public school special education programs for the trainable retarded typically have attempted to prepare students to function permanently in a sheltered and structured setting (Kirk, 1972). This is consistent with the scarcity of evidence that public school programs increase the vocational and social independence of trainable individuals (Dunn, 1963; Goldberg, 1972). Thus classroom time is largely spent on self care skills and social behaviors and in art and workshop activities, with little importance attached to academic training.

Recent successes in the academic instruction of trainable students suggest that a more optimistic view of their academic potential might be warranted. Reports of arithmetic instruction are of particular importance to the classroom demonstration presented here. Coleman (1970) Brown, Bellamy and Gadberry (1971) and Bellamy and Brown (1972) present teaching programs in which trainable students have acquired a variety of counting and adding skills.

To date, however, there has been no clear demonstration that the academic skills developed in these teaching programs will be useful outside the classroom. It remains to be shown that these academic skills will indeed increase the personal, social and vocational independence of the trainable student in his home and community.

Presented in this paper is a teaching program in which academic skills not normally included in public school programs for trainable students were first taught, and later used to develop related practical skills which would increase the independent community functioning of the students. Students were taught various counting skills, and then learned to use these skills in counting amounts of money indicated on simulated pricetags.

METHODS

STUDENTS AND SETTING

The five students (Ss) ranged in age from 13-3 to 20-6 ($\overline{X}$=16-1) in IQ (WISC or WAIS) from 46 to 69 ($\overline{X}$=54.8) and have been enrolled in special education programs from 6 to 14 years ($\overline{X}$=9.0). All currently attended a public school facility for trainable retarded and severely disturbed students.

This program was supported in part by funds granted to the Madison Public Schools by the State of Wisconsin, Department of Public Instruction, Division of Vocational Education.

Medical and psychological reports include the following diagnoses: "Down's Syndrome," "central nervous system defects with relative hypotonia, obesity and bilateral abdominal cryporichidism," "frontal lisp," and "functioning below age level in phonology, morphology, and syntax." Four have been labeled moderately retarded and the fifth as emotionally disturbed.

Ss' teachers during the past two years have added these comments to the files: " often disruptive in class," "academic programs have little to offer as potential is extremely limited," " has difficulty in abstract thinking and handling symbols associated with the 3 R's," "difficulty in problem solving, generalization and transferring knowledge," "excessive talking," "inappropriate speech and language for his age level," and "lack of emotional stability and functioning ability in an academic sense."

The instruction reported here was conducted as a regular class activity during a daily 45 minute period. S's were seated with the teacher (T) on one side of the classroom, while other students received arithmetic instruction from an aide.

MATERIALS

Materials used in the teaching program are typically available in special education classrooms. These included:

1. One hundred 3" x 5" index cards (Pricecards), on which all prices from 1¢ to $1.00 were printed. These were arbitrarily assigned to 10 sets of 10 cards, except that the first set contained prices deemed easiest on the basis of baseline performance. The sets consisted of the following Pricecards:

   Set a: 1¢, 2¢, 5¢, 10¢, 20¢, 25¢, 30¢, 50¢, 75¢, $1.00
   Set b: 59¢, 29¢, 70¢, 21¢, 36¢, 80¢, 65¢, 42¢, 83¢, 48¢
   Set c: 27¢, 93¢, 67¢, 43¢ 60¢, 82¢, 38¢, 23¢, 47¢, 17¢
   Set d: 6¢, 81¢ 90¢, 45¢, 24¢, 7¢, 69¢, 58¢, 33¢, 71¢
   Set e: 26¢, 74¢, 79¢, 44¢, 99¢, 22¢, 49¢, 63¢, 96¢, 55¢
   Set f: 14¢, 61¢ 31¢, 94¢, 89¢, 62¢, 40¢, 19¢, 32¢, 85¢
   Set g: 88¢, 52¢, 86¢, 77¢ 16¢, 8¢, 51¢, 9¢, 66¢, 34¢
   Set h: 12¢, 46¢, 15¢, 97¢, 39¢, 76¢, 64¢, 57¢, 3¢, 37¢
   Set i: 4¢, 84¢, 35¢ 41¢ 73¢, 92¢ 54¢, 28¢ 98¢, 91¢
   Set j: 68¢, 72¢, 87¢, 95¢, 11¢, 56¢, 78¢, 18¢ 53¢ 13¢

2. A set of coins consisting of 4 pennies, 4 nickels, 4 dimes, and 4 quarters.

3. Three mimeographed data sheets, each constructed in a grid form so that Ss' names could be printed on the left margin and the responses required in each task represented along the top margin. One sheet was used for each trial; a complete record of each S's responses was therefore maintained.

4. Five 3" x 5" index cards (Pointcards) on which points awarded for correct responding were recorded for each *S*. Points could be exchanged for dimes when an established amount had been accumulated. The dimes could be used to purchase soft drinks during a break which occurred within an hour after class.

5. A frequency polygon, showing the number of correct responses across trials. This was maintained by *T* on a daily basis and was displayed in the classroom throughout the program.

DESIGN OF INSTRUCTION

The teaching program was conducted in three phases. Phase I consisted of baseline assessment of *Ss*' performance on all tasks in the instructional sequence. Academic skills were taught during Phase II. In Phase III applied skills associated with counting money were alternately tested and taught. The program progressed through the following steps:

(PHASE I)	A.	Baseline measures of all tasks
(PHASE II)	B.	Teaching rote counting to 100 (Task 1)
	C.	Teaching counting by 5's to 100 (Task 2)
	D.	Teaching counting by 10's to 100 (Task 3)
	E.	Teaching counting by 25's to 100 (Task 4)
	F.	Teaching labeling Pricecards (Task 5)
	G.	Teaching identifying coins (Task 6)
(PHASE III)	H.	Teaching counting amounts of money on Set *a* Pricecards
	I.	Post-test of Set *a*; Pre-test of Set *b*
	J.	Teaching counting amounts of money on Set *b* Pricecards
	K.	Post-test of Set *b*; Pre-test of Set *c*
	L.	Teaching counting amounts of money on Set *c* Pricecards
	M	Post-test of Set *c*; Pre-test of Set *d*
	N.	Teaching counting amounts of money on Set *d* Pricecards
	O.	Post-test of Set *d*; Pre-test of Set *e*
	P.	Teaching counting amounts of money on Set *e* Pricecards
	Q.	Post-test of Set *e*; Pre-test of Set *f*
	R	Teaching counting amounts of money on Set *f* Pricecards
	S.	Post-test of Set *f*; Pre-test of Sets *g*, *h*, *i*, and *j*

The effectiveness of the teaching procedures is evidenced by the attainment of pre-defined performance criteria on successive tasks during Phases II and III. In addition the alternation of teaching and testing steps during Phase III allows for an evaluation of whether the skills acquired represent simple rote responses to specific Pricecards, or whether a more general skill in applying academic counting skills to money counting tasks was acquired. Evidence for the more general skill will accrue if increases over baseline performances are noted on untaught Pricecards during Pretests, or if successive sets require fewer teaching trials before the defined criterion performance is attained.

TEACHING PROCEDURES

Baseline

Ss' performance on all tasks was assessed prior to any instruction. Two baseline trials were conducted in which *Ss* responded to all instructional cues in each task. Assessment was conducted in a group setting. *T* presented *S* with an instructional cue and allowed *S* to respond without assistance. The response was recorded with no indication of accuracy, and a different instructional cue was presented to the next *S*. All subsequent testing trials were conducted in the same manner.

Teaching

Group organization, instructional cues and task requirements were the same during baseline measurement and teaching. During teaching *S's* first response to an instructional cue was recorded; if correct, it was followed by compliments from *T* (e.g., "Good job," "Great," "Good counting,") as well as compliments and applause from other *Ss*. *S* also received points on his Pointcard, the number depending on the task under instruction. If *S* was incorrect *T* utilized defined modeling procedures (demonstrating the correct response) or priming procedures (physically helping *S* perform the correct response) to assure that *S* finally did respond correctly to the instructional cue.

Task 1--Rote Counting to 100

a. Instructional cue: *T's* verbal instruction, "Count to 100," was presented without teaching materials.

b. Task requirement and measurement: *S* must voice all numerals 1-100 in sequence. Numerals voiced in sequence before the first error were considered correct.

c. Teaching consequence: If *S* counted correctly *T* and other *Ss* complimented him and he earned 2 points on his Pointcard. If *S* did not reach 100 but his last correct response was better (i.e., *S* counted further) than on the previous trial he received 1 point. If *S* miscounted *T* stopped him as soon as the error occurred and modeled the correct response (e.g., "After 36 comes 37"). Then *T* said, "What comes after 36?" One or two repetitions of this procedure were consistently sufficient to produce the desired response. Then *T* said, "Begin at __ (e.g., 30, or the previous even 10) and count on."

Task 2--Counting By 5's to 100

a. Instructional cue: *T's* verbal instruction, "Count by 5's to 100," was presented without teaching materials.

b. Task requirement and measurement: *S* must count by 5's to 100. Numerals voiced in sequence before the first error were considered correct.

c. Teaching consequence: If S counted correctly T and other Ss complimented him and he received points for correct responding or improvement as in Task 1. If S miscounted T stopped him as soon as the error occurred and modeled the correct response (e.g., "After 30 comes 35"). T then asked, "What comes after __ (S's last correct response)" and repeated the model when necessary until S responded correctly.

Task 3--Counting By 10's to 100

a. Instructional cue: T's verbal instruction "Count by 10's to 100," was presented without teaching materials.

b. Task requirement and measurement: S must count by 10's to 100. Numerals voiced in sequence before the first error were considered correct.

c. Teaching consequence: If S counted correctly T and other Ss complimented him and he received points for correct responding or improvement as in previous tasks. If S miscounted T used modeling procedures as in previous tasks until a correct or improved response was obtained.

Task 4--Counting by 25's to 100

a. Instructional cue: T's verbal instruction, 'Count by 25's to 100," was presented without teaching materials.

b. Task requirement and measurement: S must count by 25's to 100. Numerals voiced in sequence before the first error were considered correct.

c. Teaching consequence: If S miscounted T used modeling procedures as in previous tasks until a correct or improved response was obtained.

Task 5--Labeling Pricecards

a. Instructional cue: T's verbal instruction, "What does this card say?" was presented with each of the 100 Pricecards.

b. Task requirement and measurement: S must voice the numeral and label the cents sign that appeared on each Pricecard (i.e., "Twenty-four cents"). All Pricecards labeled correctly by Ss were recorded as correct. During baseline, but not during teaching trials, a Pricecard was counted as correct if S's only error was failure to label the cents sign.

c. Teaching consequence: If S read correctly all the cards missed previously T and other Ss complimented him and he received 2 points on his Pointcard. One point was assigned for improving previous performance. If S misread a card, T modeled the correct response (e.g., "The card says 36¢. What does it say?") until S responded appropriately. Cards labeled correctly by all Ss on two consecutive trials were no longer taught.

Task 6--Identifying Coins

a. Instructional cue: T's verbal instruction, "Touch the (penny, nickel, dime, quarter)," was presented with one of each of the coins.

b. Task requirement and measurement: S must touch the coin indicated by T. All coins correctly touched by Ss were recorded as correct.

c. Teaching **Consequence**: If S responded correctly T and other Ss complimented him and he received 1 point. If S was incorrect T modeled the correct response (i.e., pointed to the requested coin) and then repeated the initial instruction. All Ss responded correctly after T's model.

Task 7--Counting Amounts of Money on Pricecards (Sets a-j)

a. Instructional cue: T's verbal instruction, "Read the card and count out that much money," was presented with each Pricecard in a set. The set of coins containing 4 of each coin was on the table in front of S.

b. Task requirement and measurement: S must read the Pricecard and count out the amount of change indicated. A response was recorded as correct when both the reading and counting responses were correct.

c. Teaching consequence: If S counted correctly he was complimented by T and other Ss and earned 1 point on his Pointcard. Points were also assigned at the end of each trial for increases above previous trials. A variety of errors were possible on this task; the type of error committed determined the specific teaching procedures employed. If S misread a Pricecard modeling procedures described in Task 5 were used until the card was correctly labeled. T then repeated the instruction, "Count out that much money." If S did not count correctly, T first instructed him to, "Count by __ (1's, 5's, 10's, 25's)," and then repeated the initial instruction. If S still miscounted T modeled the desired verbal response (e.g., for 68¢, "25-50-60-65-66-67-68") but did not touch the coins. The initial instruction was repeated. If S failed to respond correctly after this procedure, or if S counted correctly but failed to move appropriate coins, T asked S to count as T moved coins in the proper sequence for the particular Pricecard. If S failed to respond correctly after the above procedures T modeled the entire response, and then repeated the initial instruction. One or two repetitions of this model consistently produced the correct response.

RESULTS

The instructional program required 206 trials and approximately 110 hours of instructional time during 6 months of school attendance. Students advanced through the program by attaining a defined criterion performance (two consecutive perfect trials in which all Ss responded perfectly to all instructional cues) on each task in the sequence.

Baseline measures of performance on all tasks are presented in sections labeled A in Figures I and II. These measures are clarified as the individual tasks are presented below.

Rote counting to 100 (Task 1) was taught during Trials 3-66 (Figure I-B). Of the possible total of 500 correct responses, Ss averaged 332 during Trials 1-2 (baseline), and increased from 287 in Trial 3 to 500 in Trials 65-66).

Counting by 5's to 100 (Task 2) was taught during Trials 67-111 (Figure I-C). Of the possible total of 100 correct responses, Ss averaged 72 during Trials 1-2 (baseline) and then increased from 63 in Trial 67 to 100 in Trials 110-111.

Counting by 10's to 100 (Task 3) was taught during Trials 112-114 (Figure I-D). Of the possible total of 50 correct responses, Ss averaged 40 during Trials 1-2 (baseline) and then increased from 40 in Trial 112 to 50 in Trials 113-114.

Counting by 25's to 100 (Task 4) was taught during Trials 115-117 (Figure 1-E). Of the possible total of 20 correct responses, Ss averaged 7 during Trials 1-2 (baseline) and then increased from 17 in Trial 115 to 20 in Trials 116-117.

Labeling Pricecards (Task 5) was taught during Trials 118-127 (Figure I-F). Of the possible total of 500 correct responses, Ss averaged 430 during Trials 1-2 (baseline) and then increased from 447 in Trial 118 to 500 in Trials 126-127.

Identifying coins (Task 6) was taught during Trials 128-132 (Figure I-G). Of the possible total of 20 correct responses, Ss averaged 20 during Trials 1-2 (baseline) and attained criterion performance of two consecutive perfect trials in Trials 131-132.

Counting out amounts of money indicated on the 10 sets of Pricecards (Task 7) was taught during Trials 132-206 (Figure II). Ss could make a total of 50 correct responses to each set. In addition to baseline measures obtained at the outset of the program, a 2-Trial Pre-test of Ss' performance on each set was conducted immediately prior to instruction on each set. A 2-Trial Post-test of each set was conducted immediately after teaching to evaluate performance under test conditions once again.

Counting amounts of money indicated on Pricecards in Set a was taught during Trials 132-140 (Figure II-H). The number of correct responses averaged 22 during Trials 1-2 (baseline), and increased from 35 in Trial 132 to 50 in Trials 139-140. During the Post-test (Trials 141-142) Ss averaged 47.5 correct responses.

Counting amounts of money indicated on Pricecards in Set b was taught during Trials 143-166 (Figure II-J). The number of correct responses averaged 3.5 during Trials 1-2 (baseline), 4.0 during Pre-test (Trials 141-142), and increased from 10 in Trial 143 to 50 in Trials 165-166. During the Post-test (Trials 167-168) Ss average 49.5 correct responses.

Counting amounts of money indicated on Pricecards in Set c was taught during Trials 169-180 (Figure II-L). The number of correct responses averaged 3.5 during Trials 1-2 (baseline), 41.0 during Pre-test (Trials 167-168), and increased from 42 in Trial 169 to 50 in Trials 179-180. During the Post-test (Trials 181-182) Ss average 48.0 correct responses.

Counting amounts of money indicated on Pricecards in Set d was taught during Trials 183-188 (Figure II-N). The number of correct responses averaged 4.5 during Trials 1-2 (baseline), 40.5 during Pre-test (Trials 181-182), and increased from 46 in Trial 183 to 50 in Trials 187-188. During the Post-test (Trials 189-190) Ss averaged 50.0 correct responses.

Counting amounts of money indicated on Pricecards in Set e was taught during Trials 191-198 (Figure II-P). The number of correct responses averaged 4.0 during Trials 1-2 (baseline), 45.0 during Pre-test (Trials 189-190), and increased from 45 in Trial 191 to 50 in Trials 197-198. During the Post-test (Trials 199-200) Ss averaged 49.5 correct responses.

Counting amounts of money indicated on Pricecards in Set f was taught during Trials 201-204 (Figure II-R). The number of correct responses averaged 3.5 during Trials 1-2 (baseline), 48.5 during Pre-test (Trials 199-200), and increased from 48 in Trial 201 to 50 in Trials 203-204. During the Post-test (Trials 205-206) Ss averaged 49.0 correct responses.

Pre-tests were conducted for Sets g, h, i, and j during Trials 205-206 (Figure II-S). Ss averaged 49.0, 49.5, 48.5, and 47.5 to Sets g-j respectively. Inasmuch as 95 percent accuracy was recorded for all sets, no further teaching procedures were employed.

DISCUSSION

The objectives of the instructional program were attained. The five students learned to count out from the set of coins any amount of change under $1.00.

If the trainable students now in public school special education programs are expected someday to function even semi-independently, it seems that exclusive concentration on "practical" skills in these programs may not be very practical at all. Nor, of course, is it particularly useful to stress only academic skills. Normal community activities, such as counting money, telling time, travelling, and keeping score in sports, require the practical application of academic skills. The results of this instructional program suggest that the application of an academic skill to a practical situation is itself a skill which can be systematically taught.

Our success in teaching trainable students to apply an academic skill is somewhat insignificant, however, if the appropriate application must be taught for every situation the student might encounter. In counting money, for example, if direct instruction is required for every possible amount of change, or for every possible situation, it is unlikely that a skill which is useful in the community will be developed. Community usefulness will more likely result when a general skill is developed which allows for novel applications of academic abilities. Evidence that students in this instructional program developed such a general skill in applying academic counting skills to counting different amounts of money was provided in two ways. First, for the nine arbitrarily constructed sets of Pricecards (Sets *b* thru *j*), teaching required fewer trials on successive sets: Set *b* was taught in 24 trials, Set *c* in 12 trials, Set *d* in 6 trials, Set *e* in 8 trials, Set *f* in 4 trials, and no teaching procedures were needed for Sets *g*, *h*, *i*, and *j*. Second, increases over baseline performance were noted during Pre-tests of Sets *c* thru *j*. That is, after instruction on the first two sets, the students' performance on Pricecards which had not been taught was better than their performance on these sets during baseline.

In addition to the data suggesting that the students successfully applied academic skills to counting out novel amounts of money, considerable anecdotal evidence implies that the students have developed a general skill which is functional in a variety of situations outside the classroom. Supervisors of a school workshop in which students earn small amounts of money report that the five students can and do daily count their earnings. Parents have variously reported a new interest in shopping trips and that some students suddently have become "misers," saving and counting their change. One student has opened a savings account and each week deposits change that he has earned in school programs such as the one reported here.

It is apparent, however, that the skills taught in this instructional program are not exhaustive of those needed to use money successfully in the community. A student ultimately must be able to count out amounts of money from whatever change he has at the moment, not from a specified set of coins; he must be able to count out quantities above $1.00 and to make change. Our success in developing applied counting skills in this program suggests, however, that these related skills might also be within reach. The students are now involved in an instructional program designed to teach simple change-making.

The instructional program presented here is intended as a demonstration only. The teaching design does not allow for the claim that the procedures described were completely responsible for the improvement noted, or that the same procedure will be effective with other students. However, very similar teaching programs are now progressing satisfactorily with a number of students labeled trainable retarded, educable retarded, and emotionally disturbed.

The results of this demonstration are indeed encouraging. Trainable retarded students were first taught academic counting skills, and then these skills were applied to the task of counting various amounts of money. Some evidence was obtained that the students acquired a general skill which allowed for novel applications of their counting abilities. It seems that the personal independence of trainable students can be enhanced significantly through classroom instruction.

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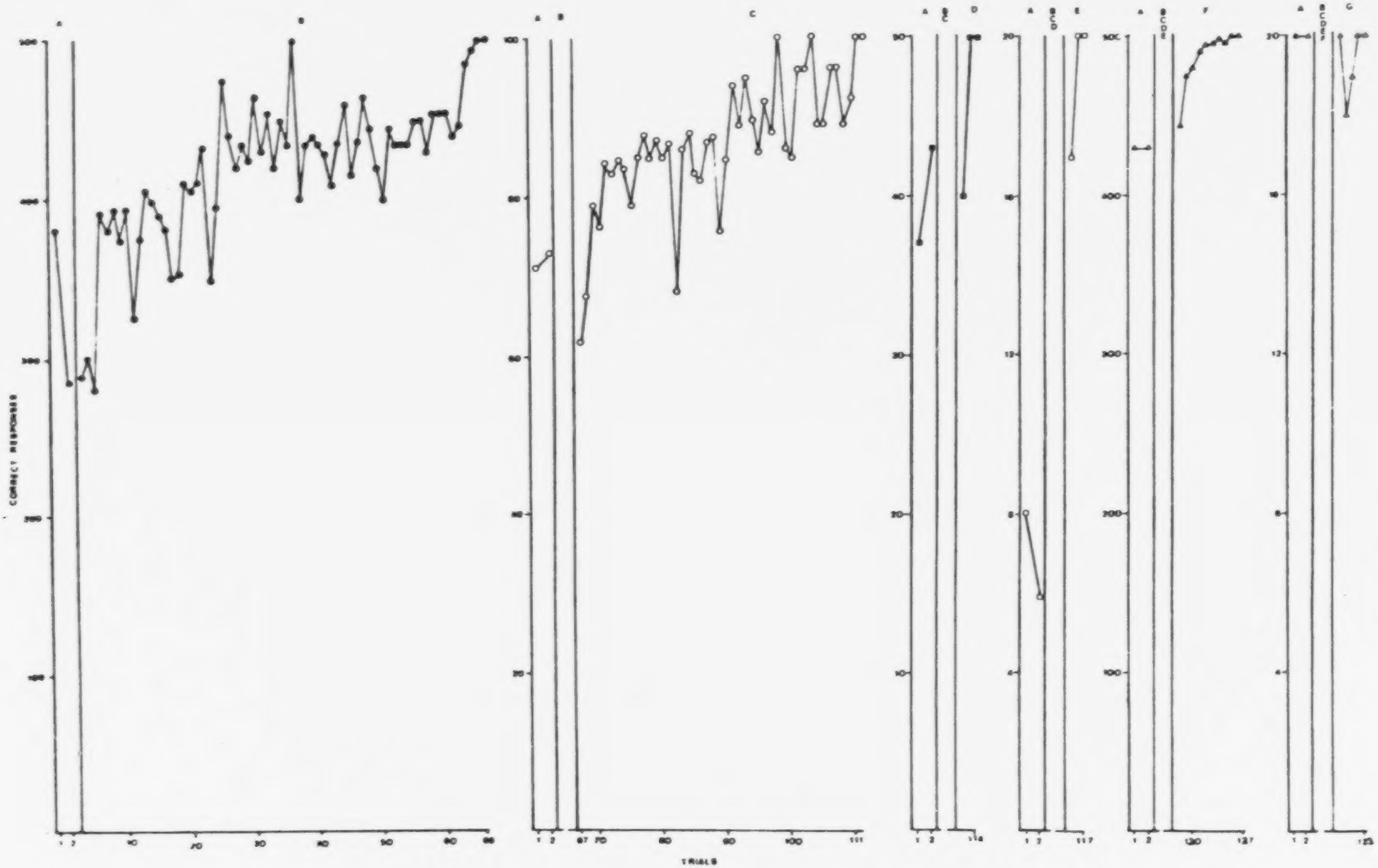
LIST OF FIGURES

Figure I: Number of correct responses to instructional cues during: A) Baseline; B) Teaching rote counting to 100; C) Teaching counting by 5's to 100; D) Teaching counting by 10's to 100; E) Teaching counting by 25's to 100; F) Teaching labeling Pricecards; and G) Teaching identifying coins.

Figure II: Number of correct responses to instructional cues during: A) Baseline; H) Teaching counting amounts of money on Set *a* Pricecards; I) Post-test of Set *a* and Pre-test of Set *b*; J) Teaching counting amounts of money on Set *b* Pricecards; K) Post-test of Set *b* and Pre-test of Set *c*; L) Teaching counting amounts of money on Set *c* Pricecards; M) Post-test of Set *c* and Pre-test of Set *d*; N) Teaching counting amounts of money on Set *d* Pricecards; O) Post-test of Set *d* and Pre-test of Set *e*; P) Teaching counting amounts of money on Set *e* Pricecards; Q) Post-test of Set *e* and Pre-test of Set *f*; R) Teaching counting amounts of money on Set *f* Pricecards; S) Post-test of Set *f* and Pre-tests of Sets *g*, *h*, *i* and *j*.

CORRECT RESPONSES
500
400
300
200
100
A
B
1
2
10
20
30
40
50
60
66
100
80
60
40
20
A
B
C
67
70
80
90
100
111
50
40
30
20
10
A
B C
D
114
20
16
12
8
4
A
B C D
E
117
500
400
300
200
100
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B C D E
F
120
127
20
16
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8
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A
B C D E F
G
TRIALS

FIGURE 1

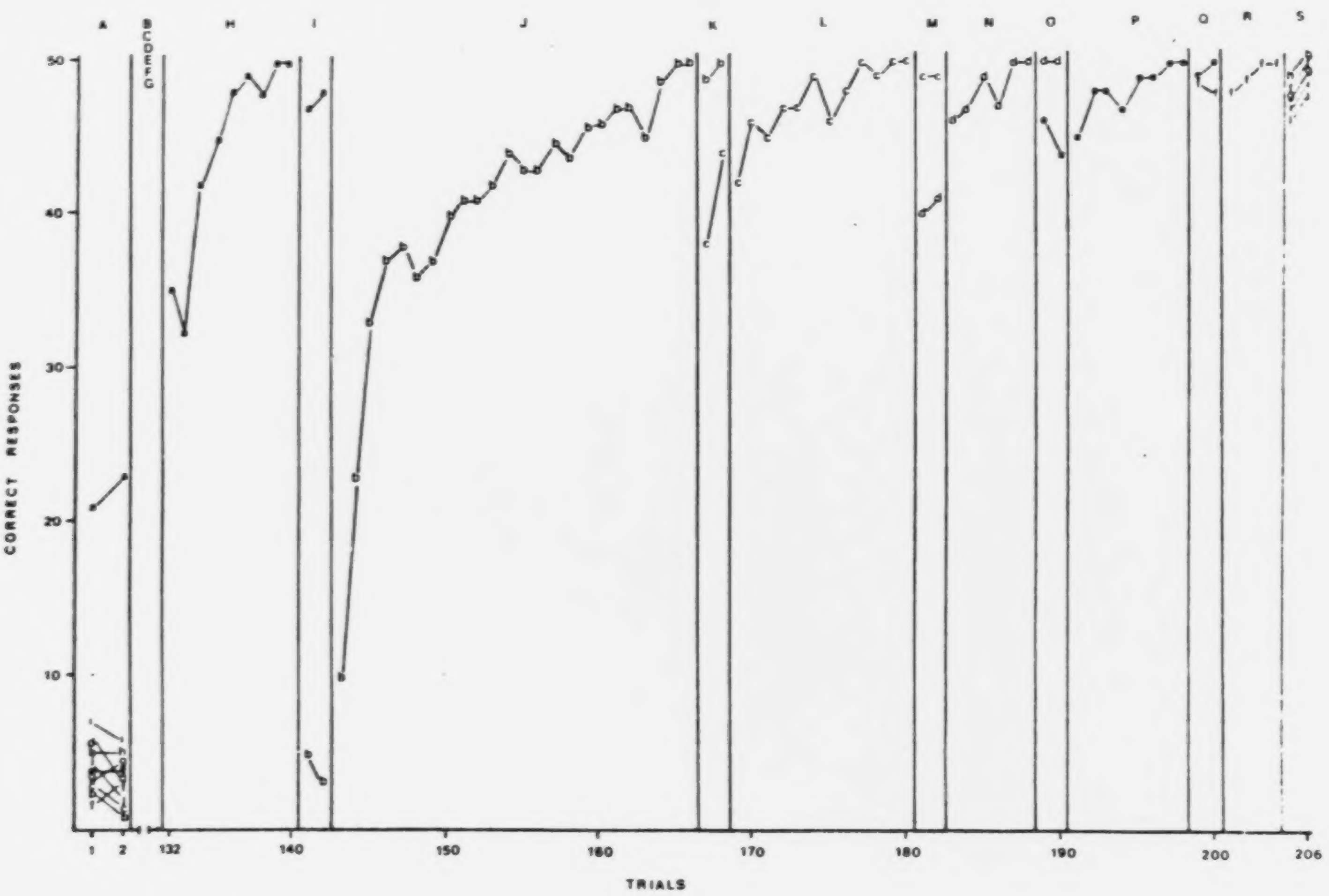
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
CORRECT RESPONSES
50
40
30
20
10
1
2
132
140
150
160
170
180
190
200
206
TRIALS

FIGURE II

Arithmetic Computation for Trainable Retarded Students: Continuing a Sequential Instructional Program

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Madison Public Schools and University of Wisconsin

Special educators have repeatedly questioned the ability of trainable retarded children to acquire any but the simplest arithmetic skills. They suggest that in an entire school career trainable students should be expected only to acquire rote counting and grouping skills, and to learn to discriminate comparative quantities such as more and less in concrete situations (Malloy, 1963; Kirk, 1972). Extended community services are being provided for many of these individuals, however, and considerable discrepancy exists between the proposed longitudinal objectives and the skills required to live in a community, even with supervision. Shopping, preparing simple meals, traveling, telling time, and counting money require the application of more complex arithmetic skills than have normally been suggested for trainable programs.

Several short-term teaching programs in arithmetic have been reported, however. Trainable students have acquired skills associated with counting quantities of objects (Brown, Bellamy, and Gadberry, 1971; Coleman, 1970), counting money (Bellamy and Laffin, 1972), and working simple addition problems (Bellamy and Brown, 1972; Brown, Bellamy, Gadberry, and Sontag, 1971). If similar success can be reported throughout a trainable student's schooling, longitudinal objectives might evolve which are more consistent with environmental demands. Cumulative sequential instruction is now needed which applies teaching procedures developed in these programs to the instruction of trainable students during successive school years.

This program was supported in part by funds granted to the Madison Public Schools by the State of Wisconsin, Department of Public Instruction, Division of Vocational Education.

The instructional program presented here is a follow-up of that reported by Bellamy and Brown (1972). They report a teaching program that was conducted with four trainable adolescents attending a public school program. In an average of seven years of prior schooling, these students had learned to rote count to 10, but they could not reliably count objects or label and write numerals. During a six-month teaching program they learned to: label numerals 1-10; write numerals 1-10; count various quantities of lines and voice the total; draw the correct quantity of lines under numerals 1-10; count various quantities of lines and write the total, and work addition problems totaling 10 or less, by drawing lines under both numerals in the problem, counting the lines, and writing the total. The four students completed this instructional program just before summer vacation.

Arithmetic instruction conducted with these four students during the subsequent year is reported in this paper. Basic to the planning and conduction of the instruction, as to the previous program, were: the definition of behavioral objectives; the specification of entering behaviors; the construction of a sequence of intermediate behaviors; the systematic manipulation of the environment; and the application of measurement and evaluation procedures (Gardner, 1971).

The definition of behavioral objectives. After completing this program students were expected to write the correct answers to mixed addition and subtraction problems involving numerals under 10, without assistance or direction from the teacher.

The specification of entering behaviors. Prior to instruction all students demonstrated at least 98 percent accuracy on the adding skill taught in the previous program. In addition, baseline measures of performance on planned instructional tasks were obtained prior to teaching.

The construction of a sequence of intermediate behaviors. Instruction was conducted in the following sequence of tasks, which progressed from the students' entering behaviors to the defined objectives of the program: Identifying the numeral following each numeral 0-9 (Task I); Counting on from each numeral 0-9 (Task II); Adding, by counting on from the first numeral in the problem (Task III); Counting backwards (Task IV); Identifying the numeral preceeding each numeral 1-10 (Task V); Counting down from each numeral 1-10 (Task VI); Subtracting, by counting down from the minuend (Task VII); and Working mixed addition and subtraction problems (Task VIII).

The systematic manipulation of the environment. Teaching each task involved allowing the students to respond without assistance to defined instructional materials, and providing differential consequences for correct and incorrect responses. This is consistent with substantial experimental evidence relating behavior occurrence to contingent positive reinforcement and modeling (Bandura, 1969; Whaley and Malott, 1971).

The application of measurement and evaluation procedures. Daily records of correct responses were maintained throughout the year. The effectiveness of the teaching program is supported by the students' attainment of defined performance criteria on each of the tasks.

METHOD

Students

Students (Ss) were 4 boys enrolled in a departmentalized public school program for trainable students and assigned to the lowest functioning class.

S_1, aged 13-9 years, has been enrolled in special education programs for the past 6 years, including one year in a residential treatment center. S_1's student file contains the following diagnoses and comments: "reactive emotional disturbance;" "minimal brain injury with possible psychiatric complications;" "trainable mental retardation;" "extreme negativism;" and "spends

90 percent of his time while in school in stereotyped activities." The Stanford-Binet test was administered to $\underline{S}_1$ during the current school year, and he obtained an IQ score of 41.

$\underline{S}_2$, aged 18-6 years, has been enrolled in public school programs for the past 3 years. Recent comments in $\underline{S}_2$'s file include: "trainable retarded;" "cooperative but distractible;" "has difficulty in following directions;" "short attention span;" and "is unable to write his name." $\underline{S}_2$ obtained an IQ score of 39 on the Stanford-Binet.

$\underline{S}_3$, aged 21-2 years, has been enrolled in special classes of the local school system for 5 years. Student files contain these comments: "outstanding disabilities in mathematics and reading;" "both fine and gross motor coordination is quite impaired;" "severe visual discrimination problem;" "is able to draw little more than a circle;" "has difficulty discriminating letters;" and "corrected visual acuity estimated at 20/200 for each eye." The Wechsler Adult Intelligence Scale was administered during the current school year, and $\underline{S}_2$ obtained a full scale IQ of 43.

$\underline{S}_4$, aged 20-5, has been enrolled in public school and community special education programs for 13 years. $\underline{S}_4$'s files contain these comments: "seldom approaches others for cooperative play;" "has great difficulty in sitting still;" "did not use any trial and error." The Wechsler Adult Intelligence Scale was administered to $\underline{S}_4$ during the current school year, and he obtained a full scale IQ of 48.

Materials

Instructional materials were constructed by the teacher from inexpensive items that are normally available in public schools. These included the following:

1. Flashcards were made from 3" x 5" white index cards. Numerals 0-9 were printed on 10 flashcards used in Tasks I and II, and numerals 1-10 were printed on 10 flashcards used in Tasks V and VI.

2. All combinations (25) of 2-number addition problems totaling 10 or less, and all combinations (45) of subtraction problems involving numerals under 10, were printed horizontally and mimeographed on 2" x 8" slips of paper. The problems were divided into sets, and during every trial which involved working problems each S worked all problems in a set. A set of problems during the test of retention and review consisted of 1 of each of the 25 addition problems. A set of problems during Task III consisted of 15 addition problems, selected so that all 25 addition problems appeared in 2 consecutive trials. A set of problems during Task VII consisted of 15 subtraction problems, selected so that all 45 subtraction problems appeared in 3 consecutive trials. A set of problems during Task VIII consisted of 15 mixed problems collected so that all addition and subtraction problems appeared at least once in 6 consecutive trials, and so that each set contained as close as possible to half addition and half subtraction problems.

3. Edibles, including a variety of candies and cereals, were used during teaching steps after correct responding.

4. A record of daily responding was maintained on mimeographed data sheets which allowed space to record all responses made during each trial. A frequency polygon, showing the number of correct responses made by the group across trials, was maintained by T on a daily basis and displayed on the classroom wall throughout the year.

All instruction was conducted with T and Ss seated around a table on one side of the classroom. Other students in the class received arithmetic instruction from an aide.

TEACHING PROCEDURES

Retention and Review of Previous Addition Skills

In the previous instructional program (Bellamy and Brown, 1972), Ss were taught to work simple addition problems by drawing lines under both numerals, counting all the lines, and writing the total. Retention of this skill was tested at the end of summer vacation, 10 weeks after the previous program was completed. The retention test consisted of two trials in which each S worked all 25 addition problems. Testing was conducted in a group setting, with Ss alternating turns. T gave S an addition problem and recorded his response without indicating to S whether the problem was correct. A different problem was then presented to the next S, etc.

The same procedure was used to review the addition skills, except that the accuracy of each problem determined the consequences that *S* received. When *S* worked a problem correctly, he immediately received an edible and warm compliments from *T* (e.g., "That's great!" or "Good work!"). Other *S*s were encouraged to applaude the correct response. When *S* worked a problem incorrectly, *T* interrupted him as soon as the error occurred, gave him a duplicate problem, and instructed him, "Draw the right number of lines under both numerals . . . Count all the lines . . . Write the total." *S*s consistently responded correctly after *T*'s instruction.

Baseline

Baseline measures of *S*s' performance on all tasks were obtained prior to any instruction. Assessment was conducted in a group setting, with *S*s alternating turns. For each task *S* was asked to respond to a verbal direction, an instructional material, or both. The response was recorded without indicating to *S* whether he had responded correctly. Another *S* was then asked to respond to a different direction or material. A baseline trial was complete when each *S* had been given the opportunity to make all responses required in each task. Two baseline trials were conducted in tasks requiring verbal responses (Tasks I, II, IV, V, and VI), and three baseline trials were conducted in tasks requiring working problems (Tasks III, VII, and VIII).

Task I: Identifying the Numeral Following Each Numeral 0-9

Task definition. A flashcard, on which a numeral 0-9 was printed, was presented to *S* with *T*'s instruction, "What numeral comes after this one?" *S* must voice the numeral following the one on the card.

Teaching procedure. A teaching trial consisted of each *S* responding to the 10 flashcards. The accuracy of *S*'s first response determined the consequences. When *S* responded correctly he immediately received an edible and warm compliments from *T* (e.g., "That's great!" or "Good work!"). Other *S*s were encouraged to applaude the correct response. When S responded incorrectly, T said, "No, that's not right. Try again. What numeral comes after this one?" If S still responded incorrectly, T modeled the correct response (voiced the correct numeral) and then repeated the instruction, "What numeral comes after this one?" Ss consistently responded correctly after T's model. Compliments always followed a correct response but edibles were given only when S's first response was correct.

Task II: Counting on From Each Numeral 0-9

Task definition. A flashcard, on which a numeral 0-9 was printed, was presented to S with T's instruction, "Count up from this numeral." S must begin with the numeral following the one on the card and count on to 10.

Teaching procedure. A teaching trial consisted of each S responding to the 10 flashcards. The accuracy of S's first response determined the consequences. When S responded correctly, he immediately received an edible, warm compliments from T, and applause from other Ss. When S responded incorrectly, T interrupted him as soon as the error occurred and said, "No, that's not right. Try again. Count up from this numeral." If S still counted incorrectly, T modeled the correct response, beginning with the last correct numeral voiced by S, then repeated the instruction, "Count up from this numeral." The modeling procedure was repeated when necessary to produce the correct response. Compliments always followed a correct response, but edibles were given only when S's first response was correct.

Task III: Addition

Task definition. An addition problem was given S without verbal instructions. S must write the correct answer to the problem. To obtain the correct answer S labelled the second numeral in the problem, drew that quantity of lines under the numeral and labelled the plus sign, saying "Count up." S then labelled the first numeral and counted on, counting once for each of the lines. The last numeral voiced was written in the space provided for the answer. To maximize correct responding during baseline, the task was altered by providing verbal instructions. During baseline, but not during teaching, T instructed S, "Draw the right number of lines under the second numeral . . . Now start with the first numeral and count up."

Teaching procedure. A teaching trial consisted of each S working a set of 15 addition problems. The accuracy of S's first response determined the consequences. When S worked a problem correctly he immediately received an edible and compliments and applause from T and other Ss. When S worked a problem incorrectly T interrupted him as soon as the error occurred and provided teaching procedures which depended on the kind of error committed. If S failed to draw the correct number of lines under the second numeral, T's instruction, "That's not right. Try again. Draw the right number of lines" was sufficient to produce the desired response. If S failed to begin counting with the first numeral, T interrupted him with the instruction, "Try again. Start counting with this numeral (pointing to the first numeral). When this instruction did not result in correct responding, T modeled the correct responses (i.e., labeled the first numeral and began counting the lines), and then asked S to work a duplicate problem. If S failed to correctly count the lines, T first instructed him to, "Try again. Count once for each line." When this instruction was insufficient, T modeled the correct response, marking off one line for each numeral voiced. On occasion Ss counted correctly but failed to write the correct answer. This error was always corrected after T's verbal instruction, "That's not right. Try again." As soon as S worked the entire addition problem correctly he was complimented, but edibles were given only when the first response was correct.

Task IV: Counting Backwards

Task definition. T's instruction, "Count down. Start at 10 and count down to 0," was presented without teaching materials. S must begin with 10 and voice each numeral in sequence. Each numeral 9-0 voiced in sequence before the first error was recorded as correct.

Teaching procedure. A teaching trial consisted of each S responding to T's instruction. The accuracy of Ss first response determined the consequences. When S responded correctly, or counted further than on any previous trial, he received edibles, praise and applause as in other tasks. When S counted incorrectly, T interrupted him as soon as the error occurred and modeled the correct response, beginning with the last correct numeral voiced by S (e.g., "No, eight, seven. Say it. Eight, seven.") When S responded, T asked him to, "Try again. Start at 10 and count down to 0." The modeling procedure was repeated when necessary to produce a correct or improved response. As before, S was complimented when this occurred, but edibles were given only when the first response was correct.

Task V: Identifying the Numeral Preceding Each Numeral 1-10

Task definition. A flashcard on which a numeral 1-10 was printed, was presented to S with T's instruction, "What numeral comes after this one?" S must voice the numeral preceding the one on the card.

Teaching procedure. A teaching trial consisted of each S responding to the 10 flashcards. The accuracy of S's first response determined the consequences. When S responded correctly he received edibles, compliments and applause. When S responded incorrectly T said, "No, that's not right. Try again. What numeral comes before this one?" If S still responded incorrectly, T modeled the correct response (voiced the correct numeral) and then repeated the instruction, "What numeral comes before this one?" Ss consistently responded correctly after T's model. Compliments were given when S responded correctly to T's instruction or model.

Task VI: Counting down from each numeral 1-10

Task definition. A flashcard, on which a numeral 0-9 was printed, was presented to S with T's instruction, "Count down from this numeral." S must begin with the numeral preceding the one on the card and count down to 0.

Teaching procedure. A teaching trial consisted of each S responding to the 10 flashcards. The accuracy of S's first response determined the outcome. When S responded correctly, he received edibles, warm compliments and applause. When S responded incorrectly, T interrupted him as soon as the error occurred and said, "No, that's not right. Try again. Count down from this numeral." If S still counted incorrectly, T modeled the correct response, beginning with the last correct numeral voiced by S. T's model was occasionally repeated to produce correct responding. Compliments were given when S responded correctly to T's instruction or model.

Task VII: Subtraction

Task definition. A subtraction problem was given S without verbal instructions. S must write the correct answer to the problem. To obtain the correct answer, S labeled the subtrahend, drew that quantity of lines under the numeral, and labeled the minus sign saying, "Count down." S then labeled the minuend and counted down, counting once for each of the lines. The last numeral voiced was written in the space provided for the answer. To maximize correct responding during baseline the task was altered by providing verbal instructions. During baseline, but not during teaching, T instructed S, "Draw the right number of lines under the second numeral . . . Now start with the first numeral and count down."

Teaching procedure. A teaching trial consisted of each S working a set of 15 subtraction problems. The accuracy of S's first response determined the consequences. When S worked a problem correctly, he immediately received edibles, warm compliments and applause. When S worked a problem incorrectly, T interrupted him as soon as the error occurred and provided teaching procedures which depended on the kind of error committed. If S did not draw the correct number of lines under the subtrahend, T's verbal instruction, "That's not right. Try again. Draw the right number of lines under the second numeral," was sufficient to produce the desired response. Similarly, if S failed to begin counting with minuend, T's instruction to, "Try again. Start counting with this numeral (pointing to the first numeral)" was sufficient to produce the correct response. If S failed to count the lines correctly, T first said, "Try again. Count down once for each line." If this was insufficient, T modeled the correct response, marking off one line for each numeral voiced. The desired response always followed one or two repetitions of the model. As soon as S worked the entire subtraction problem correctly, he was complimented but edibles were given only when the first response was correct.

Task VIII: Mixed Addition and Subtraction

Task definition. An addition or subtraction problem was given to S without verbal instructions. S must perform the required operation and write the correct answer to the problem.

Teaching procedure. A teaching trial consisted of each S working a set of 15 mixed addition and subtraction problems. The accuracy of S's first response determined the consequences. When S worked a problem correctly, he received edibles, compliments and applause. When S worked a problem incorrectly, T interrupted him as soon as the error occurred. Errors of the kinds described in Tasks III and VII occurred infrequently, and teaching procedures presented above were used when needed. Most errors on this task involved failure to perform the correct operation (i.e., Ss added subtraction problems and subtracted addition problems). A verbal indication that S had performed the wrong operation was sufficient for S to correct the error. However, due to the difficulty experienced by these and other Ss in reliably discriminating the operations, the chain of behaviors involved in the addition task was slightly modified. After labeling the plus sign as "count up," Ss were taught to begin counting aloud at 1, to point to the first numeral when that numeral was reached, and then to count the lines and write the total. Ss were always complimented when a correct response followed T's instructions or model, but edibles were given only when S's first response was correct.

RESULTS

The addition skill learned during the previous year was tested and reviewed prior to the start of this program. Each S met a criterion of 2 consecutive trials in which 98% accuracy was maintained. Of the possible total of 25 correct responses, S_1 averaged 24.0 during the retention test and met criterion after 4 teaching trials; S_2 averaged 23.5 during the retention test and met criterion after 5 teaching trials; S_3 averaged 12.0 during the retention test and met criterion after 14 teaching trials; S_4 averaged 12.5 during the retention test and met criterion after 14 teaching trials.

The present instructional program was completed in 357 trials during 9 months of school attendance. Students progressed through the program by meeting a defined performance criterion on each task (three consecutive trials in which all students responded perfectly). Baseline measures of all tasks were taken prior to instruction (Figure II-A and Figure III-A). These will be explained as individual tasks are presented below.

Identifying the numeral following each numeral 0-9 (Task I) was taught during Trials 3-57 (Figure II-B). Of the possible total of 40 correct responses Ss averaged 9.5 during Trials 1-2 (baseline) and then increased from 18 in Trial 3 to 40 in Trials 55-57.

Counting on from each numeral 0-9 (Task II) was taught during Trials 58-123 (Figure II-C). Of the possible total of 40 correct responses Ss averaged

1.5 during Trials 1-2 (baseline) and then increased from 16 in Trial 58 to 40 in Trials 121-123.

Addition (Task III) was taught during Trials 124-150 (Figure III-D). Of the possible total of 60 correct responses Ss averaged 30 during Trials 1-3 (baseline) and then increased from 37 in Trial 124 to 60 in Trials 148-150.

Counting backwards (Task IV) was taught during Trials 151-212 (Figure II-E). Of the possible total of 40 correct responses Ss averaged 2.0 during Trials 1-2 (baseline) and then increased from 10 in Trial 151 to 40 in Trials 210-212.

Identifying the numeral preceding each numeral 1-10 (Task V) was taught during Trials 213-271 (Figure II-F). Of the possible total of 40 correct responses Ss averaged 5.5 during Trials 1-2 (baseline) and then increased from 7 in Trial 213 to 40 in Trials 269 to 271.

Counting down from each numeral 1-10 (Task VI) was taught during Trials 272-297 (Figure II-G). Of the possible total of 40 correct responses Ss averaged 0.5 during Trials 1-2 (baseline) and then increased from 22 in Trial 272 to 40 in Trials 295-297.

Subtraction (Task VII) was taught during Trials 298-332 (Figure III-H). Of the possible total of 60 correct responses Ss averaged 4.6 during Trials 1-3 (baseline) and then increased from 32 in Trial 298 to 60 in Trials 330-332.

Mixed addition and subtraction (Task VIII) was taught during Trials 333-357 (Figure III-I). Of the possible total of 60 correct responses Ss averaged 14.0 during Trials 1-3 (baseline) and then increased from 47 in Trial 333 to 60 in Trials 355-357.

DISCUSSION

Four trainable retarded students, who could rote count to 10, but who could not reliably count objects or label numerals, have received measured sequential instruction in arithmetic during the last two school years. During the first year the students acquired simple addition skills in a procedure reported by Bellamy and Brown (1972). In the present instruction they learned to work mixed addition and subtraction problems correctly and consistently.

It is questionable whether trainable individuals can acquire all the arithmetic skills which would be useful in supervised community living. Certainly students in this program have made progress. They need many additional skills, however. They must learn to use numerals above 10 in basic computations, and more importantly, they must learn to apply their counting and computation skills in a variety of situations. A recent demonstration suggests that the application of arithmetic skills can be systematically taught. Bellamy and Laffin (1972) report a procedure in which trainable students first acquired numerous counting skills and then learned to use these in counting money. Toward the same end, instruction is designed for the coming school year to teach students to use their computation skills in the solution of practical problems.

Cumulative sequential instruction, such as that described here and planned for the coming year, requires that students retain skills previously taught. Failure to retain skills can mean failure in subsequent instruction. Retention data obtained in this program is thus quite encouraging. Addition skills learned in the previous program were regained in the first three weeks of the following school year, leaving the remainder of the year for more advanced instruction.

Individual differences in retention are apparent in the data, and these warrant further investigation. As can be seen in Figure 1, $\underline{S}_1$ and $\underline{S}_2$ performed more accurately during the retention test and met criterion after fewer teaching trials than did $\underline{S}_3$ and $\underline{S}_4$. A number of factors might have been responsible for this difference, and identification of these was beyond the scope of this teaching program. One possibility, suggested in the data from the previous program, is that varying amounts of overlearning might account for retention differences. Overlearning refers to the number of trials completed after a defined criterion is met (Gold and Scott, 1970). On the final addition task of the previous program students met a group criterion of 4 consecutive trials in which all responded perfectly. When this data is evaluated in light of a hypothetical individual criterion of 4 consecutive perfect trials, differences in overlearning are apparent. After meeting this hypothetical criterion Ss 1-4 had 19, 15, 10, and 7 overlearning trials respectively. This interpretation suggests that while group criteria have been useful in classroom teaching programs, important individual performance differences can be obscured in the group data.

The primary purpose of this program was instructional, and experimental manipulations which might allow for more precise evaluations of the procedures were not attempted. A complete replication of the program is available, however. Three Down Syndrome girls, age 12-4, 13-3, and 14-3, with tested IQ's (Stanford-Binet) of 35, 38, and 39, have completed the entire instructional sequence.

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List of Figures

Figure I Number of problems worked correctly by Ss 1-4 during the retention test and review of the previous addition skill.

Figure II Number of correct responses to instructional materials during: A) Baseline; B) Teaching Task I; C) Teaching Task II; E) Teaching Task IV; F) Teaching Task V; and G) Teaching Task VI.

Figure III Number of problems worked correctly during: A) Baseline; D) Teaching Task III; H) Teaching Task VII; and I) Teaching Task VIII.

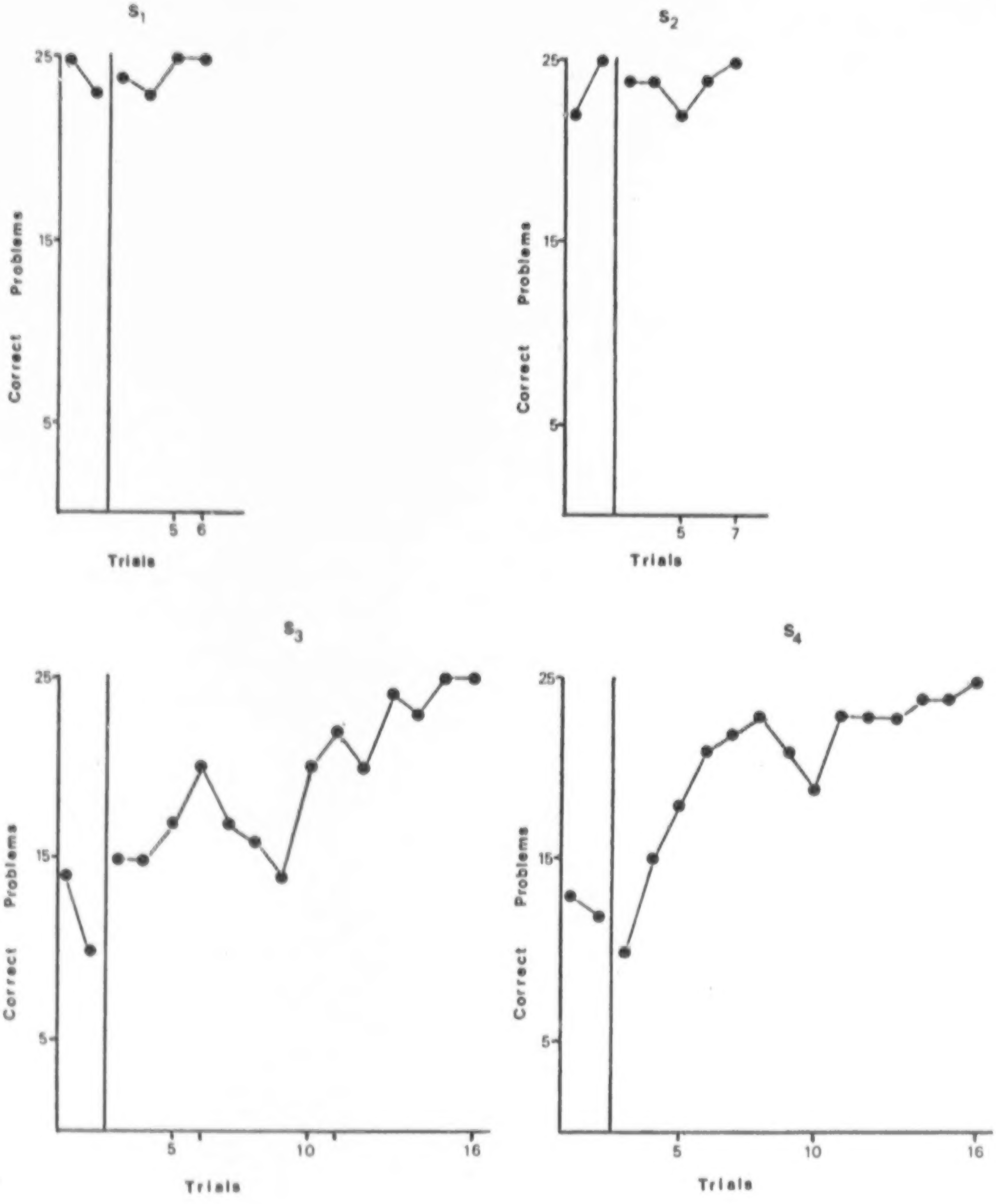

S_1
25
15
5
Correct Problems
5
6
Trials
S_2
25
15
5
Correct Problems
5
7
Trials
S_3
25
15
5
Correct Problems
5
10
16
Trials
S_4
25
15
5
Correct Problems
5
10
16
Trials

FIGURE I

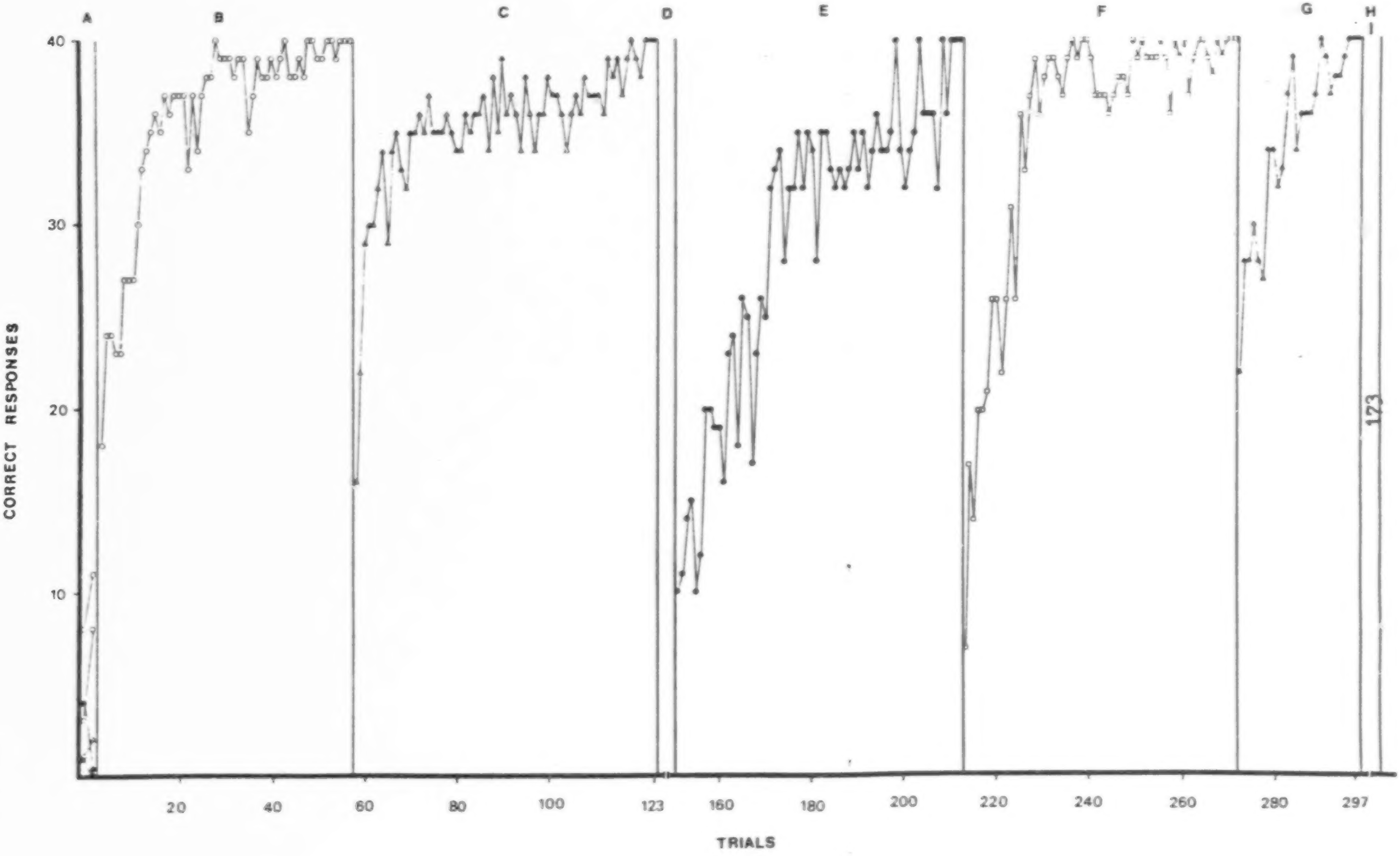

A
B
C
D
E
F
G
H
I
CORRECT RESPONSES
40
30
20
10
20
40
60
80
100
123
160
180
200
220
240
260
280
297
TRIALS

FIGURE II

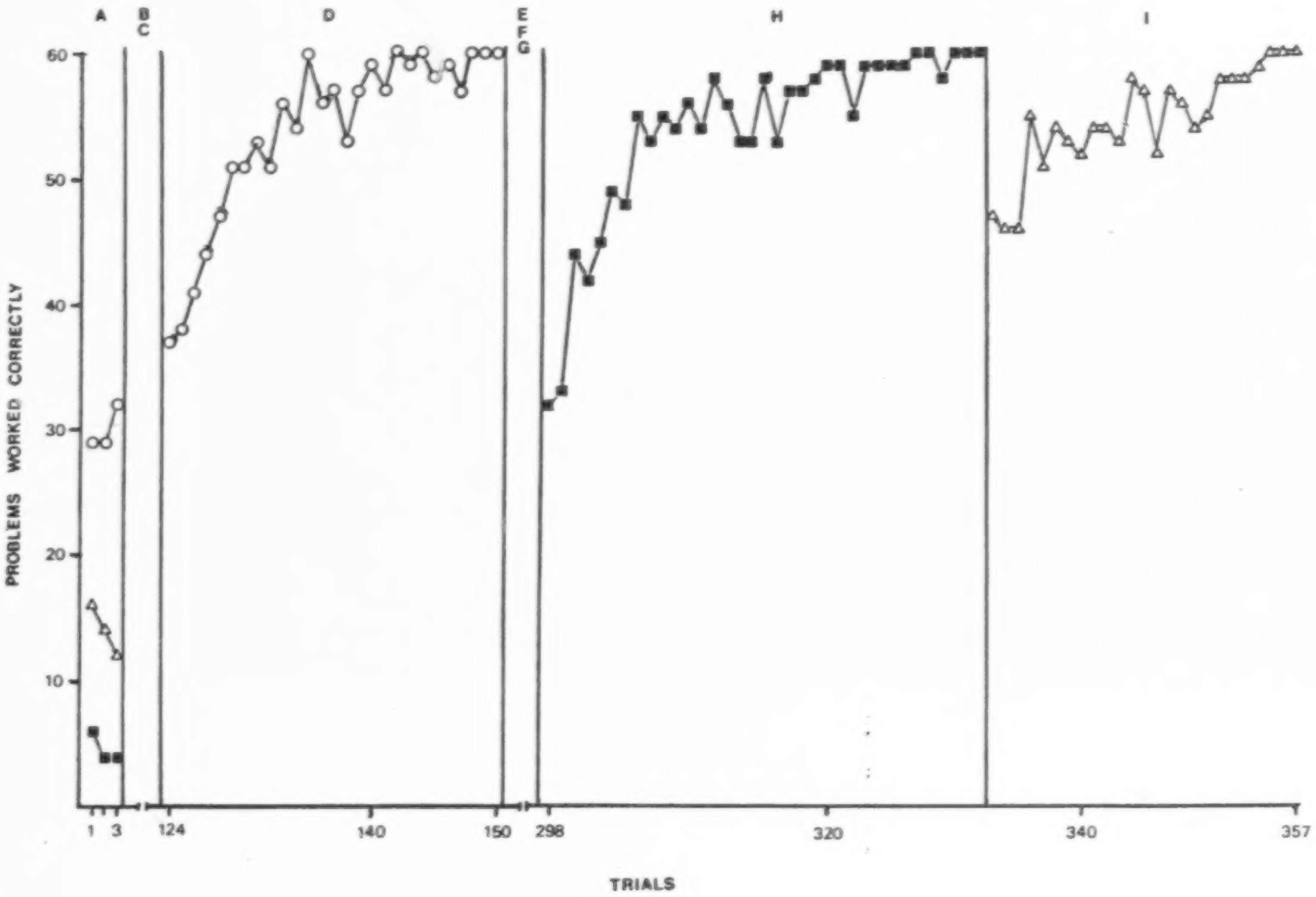

A
B
C
D
E
F
G
H
I
PROBLEMS WORKED CORRECTLY
60
50
40
30
20
10
1
3
124
140
150
298
320
340
357
TRIALS

FIGURE III

Teaching Time-Telling

Laura Pierce

Madison Public Schools

Special educators have become increasingly intent upon preparing retarded students for a life of optimum independent functioning within various community environments. An integral component of self-sufficiency or independent functioning, along with the ability to read, handle money, and use public transportation and communication facilities, is the ability to tell and function from time cues.

A retarded individual should know what time to rise and catch the bus for school or work in the morning, when to eat lunch, how long to let his dinner cook, when to tune in his favorite TV program, and when to be in bed for the night.

The program described here was developed as a means of teaching retarded students to tell time to the nearest five minute interval. It is composed of ten phases. The required performance in each phase was measured prior to teaching during an initial baseline period.

Phase I	Learning to label clock face numerals.
Phase II	Learning to discriminate clock parts.
Phase III	Learning to label the before and after sides of three different clock faces.
Phase IV	Learning to tell time on the hour.
Phase V	Learning to tell time on the half-hour.
Phase VI	Learning to label five minute intervals after the hour.

This program was supported in part by funds granted to the Madison Public Schools by the State of Wisconsin, Department of Vocational Education and in part by NICHD Grant 5 P01 HD 03352 to the University of Wisconsin Center on Mental Retardation.

Phase VII	Learning to label five minute intervals before the hour.
Phase VIII	Learning to label a mixture of five minute settings (minute hand only).
Phase IX	Learning to tell time to the nearest five minute interval on an artificial clock face.
Phase X	Learning to tell time to the nearest five minute interval on an alarm clock.

The following pages contain behavioral objectives for Phases I through X. The teacher (T) should complete the baseline procedures for all ten objectives before she commences any teaching. If the students (Ss) proceed through one or more baselines without error, these respective teaching phases may be omitted from the program. For those phases which remain to be taught, the teacher should begin with the pre-teaching steps and then work through the teaching procedure until students have met the criterion of success outlined within each behavioral objective.

All student responses during baseline and teaching trials should be recorded. A sample data sheet (See Figure 2) has been provided for this purpose on which students' names are listed vertically and the respective phase components horizontally.

Obviously, there is a difference between being able to tell time and being able to function from time cues. In our view, however, the development of longitudinal time-functioning skills are in a large part dependent upon a student's ability to tell time.

Behavioral Objective	Materials	Baseline Procedure	Pre-Teaching Procedure	Teaching Procedure
1. Given the instructional cue, Ss must be able to label, out of order, all 12 numerals on an artificial clock face two times consecutively without error. Required Responses 3, 10, 1, 4, 8, 12, 5, 7, 11, 2, 6, 9	14" x 14" clock face by Ideal (#7012)	1. T addresses S, points to numeral (3), and asks, "What number is this?" 2. S is then thanked and his response is scored and recorded as a + or - on data sheet without providing feedback regarding the accuracy of that response. 3. T addresses second S, points to different numeral (10) and repeats question and procedures of steps 1 and 2 above until each S has had an opportunity to label each of the 12 numerals twice.	1. T emphasizes that the numerals on the face are names of the hours. 2. T models several correct responses to the instructional cue.	1. Instructional cue: See Baseline Procedure #1. 2. Consequences: (A or B) A. Correct Response 1) T gives social reinforcement ("good work," "great," "I'm proud of you") awards a token, and records a + on the data sheet. 2) T gives different instructional cue to next student. B. Incorrect response 1) T records a - on the data sheet and says, "Let's try again." 2) T then repeats instructional cue and models a correct response to it. 3) T repeats instructional cue for S. a. Correct response.

Behavioral Objective	Materials	Baseline Procedure	Pre-Teaching Procedure	Teaching Procedure
				1. T gives social reinforcement ("good work," "thats right"). 2. T gives different instructional cue to next student. b. Incorrect response. 1. T says "No," and models the correct response. 2. T gives different instructional cue to next student.
II. Given the instructional cue and provided with an artificial clock face, Ss must be able to discriminate the face, long hand, hour hand, minute hand, short hand, and	14" x 14" clock face by Ideal (#7012)	1. T addresses S and says, "Point to the (face)." 2. S is then thanked and his response is scored and recorded	1. T emphasizes that: A. face includes entire front of the clock (with sweeping gesture of hand);	1. Instructional cue: See Baseline Procedure #1. 2. Consequences: See Objective I-Teaching Procedure #2.

Behavioral Objective	Materials	Baseline Procedure	Pre-Teaching Procedure	Teaching Procedure
also to indicate the direction in which the hands move two times consecutively without error. Required Responses face, long hand, hour hand, minute hand, short hand, direction in which hands move		as a + or - on data sheet without providing feedback regarding the accuracy of that response. 3. T addresses second S and asks him to discriminate a different part (long hand), repeating question and procedures of steps 1 2 above until each S has had an opportunity to discriminate each of the six parts twice.	B. long hand is very l-o-n-g, so long that it reaches all the way to the minute dots at the edge of the clock. Because it reaches all the minutes, it is also called the minute hand; C. short hand is very little. Ss should explore long-short tactile difference when the hands are placed near one another. Because it only reaches to the hours it is also called the hour hand; D. the hands always move ↻ , from smaller to larger numbers. 2. T models several correct responses to the instructional cue.	
III. Given the instructional cue and provided with three construction paper clocks, Ss must be able to label in mixed order the before and after sides of each as they are pointed to by T twice consecutively without error.	3 11"x14" pieces of white construction paper, on each of which one of the three clock faces (without hands) below is drawn:	1. T addresses S, holds up a clock (A) and runs her hand up and down one side (before), asking, "What side is this?" T may need to add the prompt, "Before or after?" 2. S is then thanked and his response is scored and recorded	1. T emphasizes that the numerals 1 through 5 are always on the after side, and that the numerals 7 through 11 are always on the before side. 2. T labels the before and after sides of each of the three clocks.	1. Instructional cue: See Baseline Procedure #1. 2. Consequences: See Objective I-Teaching Procedure #2.

	Behavioral Objective	Materials	Baseline Procedure	Pre-Teaching Procedure	Teaching Procedure
	Required Responses Clock A (before), Clock B (before), Clock C (after), Clock A (after), Clock B (after), Clock C (before)	Clock A: The before side is colored blue, the after side red. Clock B: A thick vertical line divides the before and after sides. Clock C: No division between before and after sides is indicated.	as a + or - on data sheet without providing feedback regarding the accuracy of that response. 3. T addresses second S, holds up another clock (B), runs her hand up and down one side (before), and repeats question and procedures of steps 1 and 2 above until each S has had an opportunity to label each of the six sides twice.		
IV.	Given the instructional cue and provided with an artificial clock face which has been set appropriately, Ss must be able to read the 12 time on the hour settings (i.e., "3 o'clock") two times consecutively without error. Required Responses 3 o'clock, 10 o'clock, 1 o'clock, 4 o'clock, 8 o'clock, 12 o'clock, 5 o'clock, 7 o'clock, 11 o'clock, 2 o'clock, 6 o'clock, 9 o'clock	14" x 14" clock face by Ideal	1. T sets a time on the hour (3 o'clock), addresses S and says, "What time is it?" 2. S is then thanked and his response is scored and recorded as a + or - on data sheet without providing feedback regarding the accuracy of that response. 3. T sets a different time on the hour (10 o'clock), addresses second S and repeats question and procedures of steps 1 and 2 above	1. T emphasizes that whenever the minute hand is at the top of the clock, Ss should read the hour hand first, and next the minute hand. A handy way to remember "o'clock" is to think of the minute hand as having (0) minutes. 2. T reads several time on the hour settings for Ss, pointing to each hand as it is read.	1. Instructional cue: See Baseline Procedure #1. 2. Consequences: See Objective I-Teaching Procedure #2.

Behavioral Objective	Materials	Baseline Procedure	Pre-Teaching Procedure	Teaching Procedure
		until each S has had an opportunity to respond to each of the 12 settings twice.		
V. Given the instructional cue and provided with an artificial clock face which has been set appropriately, Ss must be able to read the 12 time on the half-hour settings (i.e., 30 after 3) two times consecutively without error. Required Responses 30 after 3 (10, 1, 4, 8, 12, 5, 7, 11, 2, 6, 9)	14" x 14" clock face by Ideal	1. T sets a time on the half-hour (30 after 3), addresses S and says, "What time is it?" 2. S is then thanked and his response is scored and recorded as a + or - on data sheet without providing feedback regarding the accuracy of that response. 3. T sets a different time on the half-hour (30 after 10), addresses second S and repeats question and procedures of steps 1 and 2 above until each S has had an opportunity to respond to each of the 12 settings twice.	1. T emphasizes that whenever the long hand is at the bottom of the clock it says "thirty" because there are 30 minutes from the top to the bottom. T points to and counts each of the 30 minutes down the after side with Ss. 2. T demonstrates an (8) o'clock setting and then shows how the minute hand moves down the minute dots until the time is finally 30 minutes after (8) o'clock. 3. T emphasizes that only when the minute hand is at the top (o'clock), do Ss read the short hand first; at all other times the minute hand is read first. 4. T reads several time on the half-hour settings for Ss, pointing to each hand as it is read.	1. Instructional cue: See Baseline Procedure #1. 2. Consequences: See Objective I-Teaching Procedure #2.
VI. Given the instructional cue and provided with an artificial clock face (without hands), Ss must be able to point to and read each of the six, five-minute intervals on the after side of the	14" x 14" clock face by Ideal with both hands removed	1. T addresses S, points to each of the numerals from 1 through 6, and says, "Point to each of these numbers and tell me how many minutes (emphasized) go with them." If S does	1. T has Ss count minute dots down the after side with T, emphasizing 5, 10, 15, 20, 25, and 30 as they are arrived at. T emphasizes that these are minutes after the hour.	1. Instructional cue: See Baseline Procedure #1. 2. Consequences: See Objective I-Teaching Procedure #2.

Behavioral Objective	Materials	Baseline Procedure	Pre-Teaching Procedure	Teaching Procedure
face in uninterrupted serial order ("5, 10, 15, 20, 25, 30") two times consecutively without error. Required Responses 5, 10, 15, 20, 25, 30		not understand this direction, T may point to the numerals along with S, waiting for a response after each of of the six. 2. After S has pointed and responded to all six numerals, he is thanked and his responses are scored and recorded as +'s or -'s on data sheet without providing feedback regarding the accuracy of those responses. 3. T addresses second S and repeats the direction and procedures of steps 1 and 2 above until each S has had an opportunity to respond to each of the six numerals on the after side twice.	2. T models pointing and naming responses (5 through 30) several times for Ss.	Note: If S makes an incorrect response anywhere along the response chain, T should stop him immediately (to avoid further incorrect numeral-minute associations). T should then model the correct six responses serially, asking S to both point to and voice them with her. S should then be given the instructional cue once again and asked to respond alone. An incorrect response in this instance should be followed by modeling by T alone.
VII. Given the instructional cue and provided with an artificial clock face (without hands), Ss must be able to point to and read each of the six, five minute intervals on the before side of the face in uninterrupted serial order ("5, 10, 15, 20, 25, 30) two times consecutively without error.	14" x 14" clock face by Ideal with both hands removed	1. T addresses S, points to each of the numerals from 11 through 6, and says, "Point to each of these numbers and tell me how many minutes (emphasized) go with them. If S does not understand this direction, T may point to the numerals along with S, waiting for a response after each of the six.	1. T has Ss count minute dots down the before side with T, emphasizing 5, 10, 15, 20, 25, and 30 as they are arrived at. T emphasizes that these are minutes before the hour. 2. T models pointing and naming responses (5 through 30) several times for Ss.	1. Instructional cue: See Baseline Procedure #1. 2. Consequences: See Objective I-Teaching Procedure #2. Note: See Objective VI-Teaching Procedure Note.

Behavioral Objective	Materials	Baseline Procedure	Pre-Teaching Procedure	Teaching Procedure
Required Responses 5, 10, 15, 20, 25, 30		2. After S has pointed and responded to all six numerals, he is thanked and his responses are scored and recorded as +'s or -'s on data sheet without providing feedback regarding the accuracy of those responses. 3. T addresses second S and repeats the direction and procedures of steps 1 and 2 above until each S has had an opportunity to respond to each of the six numerals on the before side twice.		
VIII. Given the instructional cue and provided with an artificial clock face (without hour hand), which has been set appropriately, Ss must be able to read a mixture of 12 five-minute interval settings (i.e., 25 minutes after) two times consecutively without error. (The thirty-minute setting must be read as 30 minutes after).	14" x 14" clock face by Ideal with hour hand removed	1. T prepares a minute hand setting (5 min. after), addresses S and says, "What does the minute hand tell us, and what side is it on?" 2. S is then thanked and his response is scored and recorded as a + or - on data sheet without providing feedback regarding the accuracy of that response.	1. T sets the minute hand several times, demonstrating "counting down" to it by fives, repeating the last number and then supplying "before" or "after".	1. Instructional cue: See Baseline Procedure #1. 2. Consequences: See Objective I-Teaching Procedure #2. Note: If S responds incorrectly after the first cue, T should not model a correct response. Instead, T should instruct S to "count down" to the minute hand from

Behavioral Objective	Materials	Baseline Procedure	Pre-Teaching Procedure	Teaching Procedure
Required Responses 5 minutes after, 20 minutes before, 10 minutes before, 25 minutes after, 15 minutes before, 30 minutes after, 5 minutes before, 10 minutes after, 25 minutes before, 15 minutes after, o'clock, 20 minutes after		3. T prepares a different minute hand setting (20 min. before), addresses second S and repeats question and procedures of steps 1 and 2 above until each S has had an opportunity to respond to each of the 12 settings twice.		either the numeral 1 or 11 (whichever is appropriate) and arrive at the correct response on his own (i.e., "5, 10, 15, 20; 20 minutes before").
IX. Given the instructional cue and provided with an artificial clock face which has been set appropriately Ss must be able to read twelve two-hand settings (i.e., 10 min. after 11, 4 o'clock) twice consecutively without error. Required Responses 11:10, 6:35 (read as 25 min. before 7), 3:25, 8:50, 5:05, 1:55, 10:30 (read as 30 min. after 10), 2:40, 9:15, 4:00, 7:45, 12:20	Ideal #7012 clock face	1. T sets a time (11:10-10 min. after 11), addresses S and says, "What time is it?" 2. S is then thanked and his response is scored and recorded as a + or - on data sheet without providing feedback regarding the accuracy of that response. 3. T sets a different time (6:35-25 minutes before 7), addresses second S and repeats question and procedures of steps 1 and 2 above until each S has had an opportunity to respond to each of the 12 settings twice.	1. T emphasizes the order in which the clock is read: minute hand, side, hour hand. 2. T reads several settings, pointing as each hand is read to insure Ss understanding.	1. Instructional cue: See Baseline Procedure #1. 2. Consequences: See Objective I-Teaching Procedure #2. Note: 1. If S responds incorrectly after the first cue, T should not model a correct response. Instead, T should say, "Let's figure the time out together. Put your finger on the minute hand and tell me what it says (i.e., "15 min."). What side is it on? (i.e., "after") Now, put your finger on the hour hand and tell me what it says (i.e., "4"). Now, tell me the whole

	Behavioral Objective	Materials	Baseline Procedure	Pre-Teaching Procedure	Teaching Procedure
					time." T should help S to voice the three-component response as necessary, drawing his attention to each hand as it is read. It is especially important that S keep his finger and attention on the minute hand when he reports on the "side" of the clock. 2. As S becomes more adept at responding to the instructional cue, T should encourage S to find the minute hand with his eyes alone, reminding him not to look at the hour hand until he has read the minute hand and reported the side.
X.	Given the instructional cue and provided with an alarm clock which has been set appropriately Ss must be able to read 2 sets of twelve two-hand settings (i.e., 10 min. after 11, 4 o'clock) twice consecutively without error. Required Responses Set 1 5:10, 8:00, 4:30, 6:40, 11:25, 2:45, 10:20, 7:05, 9:35, 3:15, 10:55, 1:50	Alarm clock	See Objective #9, Baseline Procedure	See Objective #9, Pre-Teaching Procedure	1. Instructional cue: See Baseline Procedure #1. 2. Consequences: See Objective I-Teaching Procedure #2. Note: See Objective #IX-Teaching Procedure Note, #2.

Behavioral Objective	Materials	Baseline Procedure	Pre-Teaching Procedure	Teaching Procedure
Set 2 1:00, 5:35, 9:55, 11:20, 3:40, 7:45, 8:05, 12:25, 4:15, 6:10, 10:50, 2:30				

Certainly, this program is not the sole means of teaching time-telling. It has, however, proven to be one effective method of building such skills into the behavioral repertoire of retarded children, especially those within the trainable range. To date, seventeen students ranging in age from 12-2 to 21-2 and in I.Q. scores from 33 to 54 have successfully completed this program. Another twelve students are moving steadily through the program's intermediate phases.

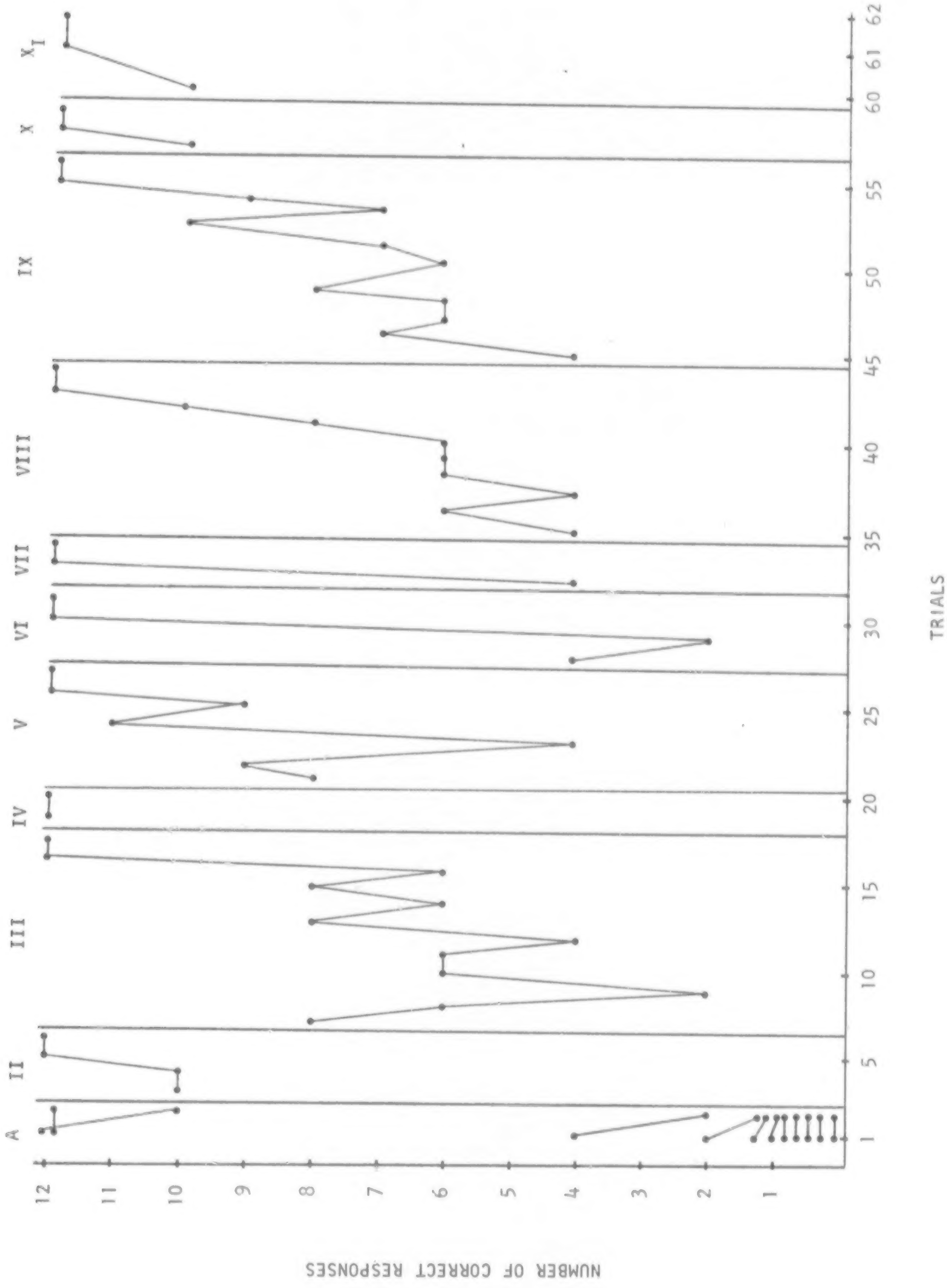
Included, in Figure I, is the graph of one student's (P) progress through the entire program. P's C.A. is 13-9. Psychological testing revealed an M.A. of 5-3 and an I.Q. (Binet) score of 46. P was also noted to be hyperactive and epileptic at the time of her evaluation. She completed the time-telling program in 62 teaching trials.

Figure I

Number of correct responses made during A) baseline period, Phase I through X.

FIGURE I

Phases



DATA SHEET I

Phase IV

Teaching I

	3:00		10:00		1:00		4:00		8:00		12:00		5:00		7:00		11:00		2:00		6:00		9:00	
S_1																								
S_2																								
S_3																								
S_4																								

Phase IV

Teaching 2

	3:00		10:00		1:00		4:00		8:00		12:00		5:00		7:00		11:00		2:00		6:00		9:00	
S_1																								
S_2																								
S_3																								
S_4																								

Phase IV

Teaching 3

	3:00		10:00		1:00		4:00		8:00		12:00		5:00		7:00		11:00		2:00		6:00		9:00	
S_1																								
S_2																								
S_3																								
S_4																								

Teaching Time Telling To Retarded Students

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Telling time is a necessary skill in any community setting. It is imperative to have some concept of time to be able to read and follow time schedules, to know when to hurry, and to know how much time must be alloted for certain tasks. It is also important that students who someday may be employed in workshops or other job settings know how to tell time. Time telling is just one task in preparing retarded students to function independently within a community setting.

This method advocates teaching of first the hours, then half-hours, the quarter hours, five minute intervals, and finally the exact minutes. It is my opinion that the more conclusive time elements be taught first. For the teacher whose students can rationally count to 60, she may first want to teach the hours and then reverse the order given above. Yet for the steps I advocate (omitting 5 minute intervals and exact minutes), the only pre-requisite skill is recognition of numerals and counting to 12. This method only deals with minutes after the hour. Time schedules are written this way as our time clocks. It does not seem necessary at this time to teach the concept "before the hour". Besides teaching the student to tell time, two other tasks are taught. The student is required to set a clock at a designated time and also to read printed time. Both objectives are important if a student is to learn to set an alarm clock or read a time schedule.

Before one teaches time telling, the teacher should establish basic time

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concepts. This, I believe, can be done by discussing the following questions and having pictures of these activities throughout the room with the printed time:

1) What time do you get up?
2) What time does school begin?
3) What time do you eat lunch?
4) What time do you go home?
5) What time do you eat dinner?
6) What time do you go to bed?

To introduce the concept of 24 hours in a day with each hour occurring twice, discuss what you do at the same hour in the morning and at night. (EX. 8:00 A.M. - Go to school; 8:00 P.M. - Watch TV)

FORMAT

I. Introduce Numbers and Hands on the Clock
    A. Introduce Numbers
    B. Introduce the Little (Hour) Hand
    C. Introduce the Big (Minute) Hand
    D. Use Both Hands Together
    E. Recognize Clock Movement
II. Teaching the Hours (1:00 - 12:00)
    A. After setting the clock, ask the student what time it is.
    B. Have the student fix the clock at a set hour.
    C. Have the student identify the printed time (1:00 - 12:00)
III. Teaching the Half-Hours
    A, B, & C as in Step II (1:30 - 12:30)
IV. Integrating the Hours and Half-Hours
    A, B, & C as in Step II using both hours and half-hours.

V. Teaching 15 minutes after the hour

   A, B, & C as in Step II (1:15 - 12:15)

VI. Integrating the hours, half-hours, and 15 minutes after the hour

   A, B, & C as in Step II using hrs., half-hrs., and 15 min. after the hr.

VII. Teaching 45 minutes after the hour

   A, B, & C as in Step II (1:45 - 12:45)

VIII. Integrating the hours, half-hours, and quarter hours

   A, B, & C as in Step II using hrs., half-hrs., and quarter hrs.

IX. Teaching 5 Minute Intervals

   A. Teaching 1:00 - 1:10

   B. Teaching 1:15 - 1:25

   C. Teaching 1:30 - 1:40

   D. Teaching 1:45 - 1:55

   (After each step, perform as in Step VI adding the new times learned.) Steps A, B, C, and D may be combined in one teaching step if S can count to 60 by 5's and can pair the numbers on the clock with his counting.

X. Teaching the Exact Minutes

   A, B, & C as in Step II

METHODS

The method used throughout the program is the following: Stimulus is given. If a correct response occurs first time, an appropriate positive reinforcement is given. If there is no response or an incorrect response, the stimulus-response pattern is modeled by the teacher. Then the stimulus is again presented. Verbal praise is given if a correct response occurs.

The required performance in each phase was measured prior to teaching during an initial baseline period. If the students proceed through one or more baselines without error, those respective teaching phases may be omitted from the program.

	OBJECTIVES	METHODS	MATERIALS
I A.	The student will identify the numbers on the clock.	Stimulus - What # am I pointing to? Response - Correct number is spoken by student.	Self-Made Clock with no hands
	The student will identify missing numbers on the clock.	S - What number belongs here? R - Correct number.	Flashcards with incomplete face clocks.
B.	The student will tell the teacher what the little hand means and what number it points to.	First - Model. S - What does the little hand tell you? R - The hour.	Self-Made Clock with only the little hand.
B_1	The student will tell the T what number the hour hand follows (or points to).	S - Good, now what number does it point to (or follows)? R - Correct number.	
C.	The student will tell the teacher what the big hand means and what number it points to?	First - Model. S - What does the big hand tell you? R - Minutes after the hour. S - Good, now what number does it point to? R - Correct number.	Self-Made Clock with only the big hand.
D.	Student will tell you what number the minute and hour hand each point to?	S - What number does the hour hand point to (or follow)? R - Correct number. S - What number does the minute hand point to? R - Correct number.	Self-Made Clock with both hands. Regular Clock
E.	Student will demonstrate with hand movement in which direction the clock hands move.	S - Show me in what direction the clock hands move. R - Correct clockwise motion with hands.	Self-Made Clock Regular Clock

OBJECTIVES	METHODS	MATERIALS
II A. The student will tell the correct time on the hour (1:00 - 12:00) by looking at a demonstration clock.	Instruction - When the min. hand is on the 12, it always means o'clock. The hr. hand tells us what hr. or what o'clock. Model S_1 - Where is the minute hand? R - 12 S_2 - Where is the hr. hand? R - Correct number. S_3 - Good, now what time is it? R - _____ o'clock.	Self-Made Clock Regular Clock
B. The student will fix a clock on a set hour designated by the teacher.	S - Show me _____ o'clock. R - The student fixes the clock at the set hr. R_2 - The student fixes the clock at the wrong hr. S - It is _____ o'clock. O'clock - Where does the min. hand go. R - 12 (S moves the hand) S - Good, it is _____ o'clock. _____. Where does the hr. hand go? R - Correct number (S moves the hand)	

	OBJECTIVES	METHODS	MATERIALS
C.	The student will identify the printed time of the hours (1:00 - 12:00) on flashcards.	Instruction - This is how 1:00 is written. The first number tells you the hr. Then there are 2 dots followed by 2 zeros. 00 means o'clock. Model. S - What time does it say? R - _____ o'clock.	Flashcards with the printed time of the hours. (1:00 - 12:00)
III. A.	The student will tell the correct time on the half-hour by looking at a demonstration clock.	Instruction - When the min. hand is on the 6, it always means 30 minutes after the hour. The hr. hand falls between two numbers. The number it follows is the hr. after which 30 minutes has passed. Model - Fix the clock at 1:30. This says 30 minutes after one. We say it is 1:30. S_1 - Where is the min. hand? R - 6 S_2 - Good, the hr. hand is after what number? R - Correct number. S_3 - Good, what time is it? R - _____:30.	Self-Made Clock Regular Clock

OBJECTIVES	METHODS	MATERIALS
	S_4 _____:30 means the same as what? R - 30 min. after _____.	
B. The student will fix the clock on a designated half-hour set by the teacher.	Same as in II B. with half-hours replacing the hours.	Self-Made Clock Regular Clock
C. The student will identify the printed time of the half-hours on flashcards.	Same as II C. with ___:30 replacing __:00.	Flashcards with the printed time of the half-hours (1:30 - 12:30)
IV. A. The student will tell the correct time on the hour and half-hour by looking at a demonstration clock.	Integration of Methods in Steps II & III A.	Self-Made Clock Regular Clock
B. The student will fix the clock on a designated hour or half-hour as told by the teacher.	Integration of Methods in Steps II & III B.	
C. The student will identify the printed time of the hours & half-hours on flashcards.	Integration of Methods in Steps II & III C.	Flashcards with the printed time of the hours and half-hours.
V. A. The student will tell the correct time of 15 minutes after the hour by looking at a demonstration clock.	Same as in II A. with ___:15 replacing ___:00. (The min. hand on the three always means 15 minutes after the hour.)	Self-Made Clock Regular Clock

OBJECTIVES	METHODS	MATERIALS
B. The student will set the clock at 15 min. after a designated hr. as told by the teacher.	Same as in II B. with 15 min. after the hr. replacing the hours. S_1 - 1:15 means what? R_1 - 15 min. after 1. S_2 - (Show me 1:15).	Self-Made Clock Regular Clock
C. The student will identify the printed time of 15 minutes after the hour on flashcards.	Same as in II C. with ___:15 replacing ___:00.	Flashcards with the printed time of 15 min. after the hr. (1:15 - 12:15).
VI. A. The student will tell the correct time on the hour, half-hour, and 15 minutes after the hour by looking at a demonstration clock.	Integration of Methods in Steps II, III & V A.	Self-Made Clock Regular Clock
B. The student will set the clock at a set hour, half-hour, or 15 minutes after the hour as told by the teacher.	Integration of Methods in Steps II, III, & V B.	
C. The student will identify the printed time of hours, half-hours, and 15 minutes after the hour on flashcards.	Integration of Methods in Steps II, III, & V C.	Flashcards with the printed time of hrs., half-hrs., and 15 min. after the hour.

OBJECTIVES	METHODS	MATERIALS
VII. A. The student will tell the correct time of 45 minutes after the hour by looking at a demonstration clock.	Same as in II A. with ___:45 replacing ___:00. (The min. hand on the 9 always means 45 minutes after the hour)	Self-Made Clock Regular Clock
B. The student will set the clock at 45 minutes after a designated hour as told by the teacher. (1:45 - 12:45)	Same as in II B. with 45 min. after the hr. replacing the hours. S_1 - What does 1:45 mean? R_1 - 45 min. after 1. S_2 - (Show me 1:45).	
C. The student will identify the printed time of 45 min. after the hr. on flashcards.	Same as in II C. with ___:45 replacing ___:00.	Flashcards with the printed time of 45 min. after the hr. (1:45 - 12:45).
VIII. A. The student will tell the correct time on the hr., half-hr., and quarter hr. by looking at a demonstration clock.	Integration of Methods in Steps II, III, V & VII A.	Self-Made Clock Regular Clock
B. The student will set the clock at a fixed hr., half-hr., or quarter hr. as told by the teacher.	Integration of Methods in Steps II, III, V & VII B.	

OBJECTIVES	METHODS	MATERIALS
C. The student will identify the printed time of hours, half-hours, or quarter hour on flashcards.	Integration of Methods in Steps II, III, V, & VII C.	Flashcards with the printed time of hrs., half-hrs & quarter hours.
IX. A. The student will tell the correct time of 5 and 10 minutes after the hour.	Instruction - Each number means 5 more min. after the hr. when the min. hand points to it. Start 1:00. Demonstrate 1:05 and 1:10.	Self-Made Clock Regular Clock
A_1 Proceed as in Step II, B & C.	Proceed as in Step II, B & C.	
A_2 Proceed as in Step VIII, A, B, & C adding 5 and 10 min. after the hour.	Integration of Methods in Steps II, III, V, VII, & IX A.	
B. The student will tell the correct time of 20 and 25 min. after the hour.	Same as in IX A. only beginning at 15 min. after the hour and continuing until 25 min. after the hr.	
B_1 Proceed as in Step II, B & C.	Proceed as in Step II, B & C.	
B_2 Proceed as in Step IX A_2, adding 20 and 25 min. after the hour.	Integration of Methods in Steps II, III, V, VII, & IX A & B.	
B_2 Proceed as in Step IX A_2, adding 20 & 25 min. after the hr.	Integration of Methods in Steps II, III, V, VII, & IX A & B.	

OBJECTIVES	METHODS	MATERIALS
C. The student will tell the correct time of 35 and 40 min. after the hour.	Same as in IX A. only beginning at 30 min. after the hr. and continuing until 40 min. after the hour.	
C_1 Proceed as in Step II, B & C.	Proceed as in Step II, B & C.	Self-Made Clock Regular Clock
C_2 Proceed as in Step IX B_2, adding 35 and 40 minutes after the hr.	Integration of Methods in Steps II, III, V, VII, & IX, A, B, & C.	
D. The student will tell the correct time of 50 & 55 minutes after the hour.	Same as in IX A. only beginning at 45 min. after the hour and continuing until 55 minutes after the hour.	
D_1 Proceed as in Step II, B & C.	Proceed as in Step II, B & C.	
D_2 Proceed as in Step IX C_2, adding 50 and 55 minutes after the hour.	Integration of Methods in Steps II, III, V, VII, & IX, A, B, C, & D.	
X. A. The student will tell the correct time of any time fixed on the demonstration clock.	Instruction: Teacher models counting to 60 on the clock.	Self-Made Clock Regular Clock

OBJECTIVES	METHODS	MATERIALS
	Explanation is given for small lines (minutes) and darker lines (five min. intervals).	
Proceed as in Step II, B and C.	Proceed as in Step II, B and C.	
Proceed as in Steps VIII and IX adding exact minutes.	Integration of Methods in Steps II, III, V, VII, IX, and X.	

This program is just one approach to teaching time-telling. It has, however, proven to be a successful method in teaching retarded children, both trainable and educable, to read a clock, set a clock, and read the printed time. Nine children have successfully completed the program.

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A Procedure For Teaching Retarded Students To Use Three Word Utterances

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Oral language is an important tool for adequate functioning in developmental communities. The communication abilities of retarded persons show several deficits (i.e., in phonology, speech sound production, vocabulary and articulation) and are below that of the normal population (Bricker & Bricker, 1970; Lynch & Bricker, 1972, McCarthy, 1971; Spradlin, 1963). Information on language development and usage by retarded children is limited and any conclusion that "the retarded child develops the language code in the same order as those children without intellectual deficits, but at a slower rate...is equivocal" (Miller & Yoder, 1972). However, since retardates do have definite communication problems the content of the language program discussed here is based on current theoretical perspectives of the structure and sequential acquisition of normal language. It integrates specific aspects of linguistic theories of language learning with the measurement and learning principles employed by applied behavior analysts.

The basis of the linguistic model of language is a "generative grammar" - a set of rules capable of completely describing a language and allowing for production or "generation" of all grammatically correct sentences (Lynch & Bricker, 1972). Bloom (1970) discussed the development of this grammar as an interaction of three major components: 1) linguistic competence; 2) non-linguistic experience; and 3) cognitive perceptual organization relating language competence to both a linguistic and cognitive system. Several authors suggest that cognitive perceptual organization cannot be specifically programmed (Miller & Yoder, 1972; Lynch & Bricker, 1972). It seems, however, that actual language production might be improved within a given level of cognitive perceptual functioning. The following discussion deals with only environmental factors (linguistic and non-linguistic) effecting language production.

Grammar is a description of speech made up of three elements - syntax, semantics, and phonology, all of which develop in a hierarchy of increasingly difficult structures (Bloom, 1970; Slobin, 1971). Syntax, which specifies the acquisition of structures, also generates a sentence. The other two elements, semantics and phonology, effect the way a speaker produces the utterance. This differentiation (Slobin, 1971) clarifies the linguistic and cognitive systems of language as they interact in language acquisition (Bloom, 1970; Miller & Yoder, 1972). This teaching program focuses on syntax in relation to hierarchical development. It is designed to improve language production rather than enhance general cognitive perceptual functioning.

The program presented here is based upon the rationale that a retarded child develops language in the same sequence as a normal child, but at a slower rate. Thus, research on normal processes and hierarchies of syntactic development is relevant to retarded development. The acquisition of syntax has been described by Bellugi and Brown (1964) as progressive differentiations of word usage and syntactic classes. They suggest that this includes three processes:

1) imitation and reduction; 2) imitation and expansion; and 3) induction of the latent structure. The latter is the most complex and the three processes are integrated over time. In addition Bloom (1970) has outline a sequential development of syntax for normal children as follows:

GENERAL FORM	GENERAL FUNCTION
Single word	Relational terms Substantive (referent)
Word string	Topic comment
Two word utterances	Verb-object Subject-object Subject-verb
Three word utterances	Subject-verb-object Develop noun phrase

Structure and processes of syntax development are interrelated in language acquisition. The focus of this paper is an explanation of a teaching procedure designed to elicit three word utterances, of the form subject-verb-object, from students who were observed to occasionally use two word utterances in response to various verbal cues in the classroom situation. Student imitation of the appropriate response modeled by the teacher was used as the teaching procedure.

The teaching methods represent an application of applied behavior analysis. Basic to this approach are: The definition of behavioral objectives; the specification of entering behaviors; the systematic manipulation of the environment; and the application of measurement and evaluation procedures (Gardner, 1971; Haring, 1968).

The definition of behavioral objects: The terminal objective of this program requires students to: a) verbalize a three component response of the form subject-verb-object, to the teacher's verbal stimulus "What's happening", (paired with the teachers demonstration of the action required in the response); b) verbalizes three component responses to pictures of the demonstrations stated in (a) above; c) verbally expand the three component responses by first, compounding verbs and then objects when the teacher presents an action demonstration and the question, "What's happening?"; and d) verbally expand the three component responses by compounding first verbs and then objects, upon presentation of pictures of the action demonstrations in (d) above.

Specification of Entering Behavior: Quantitative measures of each student's ability to identify verbally the objects used in the action demonstrations was verified. Baseline measures were taken of the verbal responses required in the program prior to any teaching of these responses.

Systematic Manipulation of the Environment: Teaching the terminal objectives required manipulation of specific consequences dependent upon a student's response to T's verbal stimulus "What's happening?", paired with a demonstration. These manipulations are based upon experimentally established principles relating behavior occurrence to contingent positive reinforcement, modeling and discriminative stimulus control (Whaley & Malott, 1968).

Application of Measurement and Evaluation Procedures: During the baseline and teaching sessions the number of correct responses per trial was recorded. Specific criteria of acceptable performance were predetermined for each task.

There are several other points of discussion pertinent to the program design. It has been suggested that the "wh" question form used here (What's happening) is one of the most simple question forms used in beginning language (Brown, 1968). "What is" questions were pretested by requiring the verbal identification of each object used in the teacher demonstrations. Competence in responding to the "What is" question form supports usage of the next level "What-do" (What's happening) form used in the teaching program.

Imitation was used as the teaching procedure in this program, both to elicit three-word utterances and to expand these three-word utterances in more complex word strings. Imitation has been questioned as a method of teaching language, since grammar rules increase in complexity and differentiation with maturation. Repetition of another's speech may not be a means to facilitate personal expression, but rather a reinforcement for mimicking (Menyuk, 1963 (a) and 1963 (b). However, current research indicates that simple grammar rules can be taught by an imitative training procedure (Guess, Sailor, Rutherford, & Baer, 1968; Sherman, 1970). Evidence is also available that imitation increases interaction with, and control of, the environment. Imitation can be used to shape new verbal responses and is the most efficient teaching procedure in initiating verbal behavior (Peterson, 1968; Lynch & Bricker, 1972).

In modeling correct responses during the teaching program the progressive tense was used. This technique is supported in several sources which emphasize that "children begin speaking in the present tense, most often present progressive." (Gleason, 1971; Lynch & Bricker, 1972).

In designing the sentence sets, demonstrable actions were chosen based on familiarity and functionality in a retarded child's environment. Teaching sentence sets first with concrete objects and then with more abstract pictures is a common teaching practice to facilitate generalization of skills.

A unique feature of this teaching program is its implementation with a group of retarded children. The students involved in the program currently attend a public school special education facility for trainable retardates. There were 10 students ranging in age from 10 yrs. to 20 yrs. ($\overline{X}$=15.6) and in IQ from below 30 to 54 ($\overline{X}$=41.2). Selection of this group was made by the authors based on an informal evaluation of their language behavior in social and academic settings. A formal method of determining entrance into this program is outlined later in the paper. The 10 students were divided into 4 groups (2 groups of 3 students and 2 groups of 2 students). Each one of 4 teachers worked with one group, keeping methods, materials and procedures constant across groups so that group comparisons could be made. Results of the demonstration are included throughout this paper where appropriate.

The task analysis to follow will delineate the specific sequential order of tasks employed in the teaching procedure.

Materials

The materials used in this program consisted of the following:

book
empty paper cup
paper cup with water
scissors
crayons
cookie
8 x 11 blank sheets of paper
8 x 11 paper, drawing of a house
magazine
empty milk carton
paper napkin
M&M's
Ten, 5 x 13 black and white photographs

Task Descriptions

Phase I A - Verbalizing a three component response (S-V-O) to a demonstration of:

name reading book
name pouring water
name cutting paper
name breaking cookie
name drawing flower

B - Verbalizing a three component response (S-V-O) to photographs of IA.

C - Verbalizing a three component response (S-V-O) to a demonstration of:

name folding napkin
name shutting magazine
name opening milk
name coloring house
name eating candy

D - Verbalizing three component response (S-V-O) to photographs of IC.

Phase II A - Expanding a three component response to a compound verb (demonstration)

name reads and shuts book
name opens and pours milk
name folds and cuts paper
name draws and colors flower
name breaks and eats cookie

B - Expanding a three component response to a compound verb (photographs of IIA).

C - Expanding a three component response to a compound object (demonstration)

name shuts book and magazine
name pours water and milk
name folds paper and napkin
name colors flower and house
name eats cookie and candy

D - Expanding a three component response to a compound object (photographs of IIC).

Teaching Procedure

Baseline - S's performance on all tasks was assessed prior to the onset of any instruction. Two baseline trials were conducted in which each S responded to all instructional cues in each of the four tasks of Phase I. Assessment was conducted in a group setting. T presented S with an instructional cue and allowed S to respond without indication of accuracy. A different component of the set being baselined was presented to the next S. All subsequent testing trials were conducted in the same manner.

Teaching

Group organization, instructional cues, and task requirements were the same during baseline measurement and teaching. During teaching, S's first response to the initial instructional cue was recorded; if correct it was followed by compliments from T (e.g., "great", "wow", "good job", "nice talking"). S also received points on a point card, the number dependent upon the task under instruction. Points were exchanged at the end of a teaching session for food (S could choose from a variety of candy bars). Criterion for all tasks in the program was defined as 100% performance in two consecutive teaching trials.

If S was incorrect, T modeled the appropriate response, repeated the instructional cue and verbally praised S for a correct response. If S again responded incorrectly, when the instructional cue was repeated, T modeled the response word by word (ex. T "Domnie", S "Domnie"; T "cutting", S "cutting"; T "paper", S "paper"). To assure that S did respond correctly to the instructional cue, T praised S for the prompted correct response.

Task Analysis

Task IA - Verbalizing a three component response (S-V-O) upon demonstration) by I.

1) Instructional cue: For tasks in which the action was demonstrated T's verbal stimulus "Watch me - what's happening" was presented while T performed the action (ex. T cutting paper).

2) Task requirement and measurement: S must respond to T's stimulus by verbalizing a three component utterance, in the correct syntactical order of subject-verb-object (ex. Domnie cutting/cuts paper). T recorded the number of utterances verbalized by S but only three component utterances upon initial response were considered correct.[1]

3) Teaching consequence: If S responded correctly, after the initial instructional cue, he earned a point on his point card[2] and was socially reinforced by T. If S did not respond correctly, after the initial instructional cue, he received no points, but was verbally praised for correct modeling of T's subsequent instructional cue.

Task IB - Verbalizing a three component response to photographs of IA.

1) Instructional cue: T's verbal stimulus "What's happening?" was presented, while presenting S with one of the photographs.

2) Task requirement and measurement: Same as described in Task IA.

Teaching consequence: Same as described in IA.

Task IC - Verbalizing a three component response (S-V-O) to Set II.

All of 1), 2), and 3) same as described in Task IA.

Task ID - Verbalizing a three component response (S-V-O) to photographs of IC.

All of 1), 2), and 3) same as described in Task IA.

Task IIA - Expanding a three component response to a compound verb by T's (demonstration) of the two actions.

All of 1), 2), and 3) same as described in Task IA.

Task IIB - Expanding a three component response to a compound verb (photographs).

All of 1), 2), and 3) same as described in Task IB.

Task IIC - Expanding a three component response to a compound object by T's (demonstration) of the action.

All of 1), 2), and 3) same as described in Tasks IA.

Footnotes:

1. Since the purpose of this teaching program was to develop three word utterances and not specific responses to stimuli; synonyms for the subject (and/or) verb were accepted. As an example, you was considered a correct response instead of T's names..."make" or "coloring" were acceptable, in place of drawing etc.. At times S would describe a situation by uttering two object words, i.e. "scissors paper" rather than the S-V-O order. "Scissors" would then be scored as an incorrect response, even though the S could be using "scissors" as a verb.

2. Point value was determined at baseline. The mean number of correct responses at baseline and was computed for each step. The first teaching session required points totaling one above the mean of baseline before the points were exchangeable for candy. During subsequent teaching sessions, the criterion for candy reinforcement was a total number of points one greater than the point total of the previous session.

Task IID - Expanding a three component response to a compound object (photographs).

All of 1), 2), and 3) same as described in Task IB.

Measurement Paradigm

Baseline IA, IB, IC, ID
Teach IA
Test IA, IB
Teach IB
Test IB and IC
Teach IC
Test IC and ID
Teach ID
Test ID
Test IA, IB, IC, ID
Baseline and teach expansion

DISCUSSION

In developing this program, the multiple baseline design developed by Risley and Baer was adapted (1971). A true multiple-baseline design employs continuous and simultaneous measurement of correct responses to all behaviors under scrutiny, while only one is submitted to the experimental treatment - (teaching). In this program we have continuously measured only one behavior at a time; e.g. 3-word sentences in response to teacher demonstration. We have alternated teaching and testing trails for a measurement design that allows for the use of a larger percentage of classroom time for teaching (refer to measurement paradigm).

As mentioned before, four groups of students participated in this program. Graphs recording the frequency of three-word sentences were kept for each group. Although each individual could make 15 responses each trial (5-three-word utterances); a correct response was defined as the occurrence of a three-word utterance in the correct grammatical order. Groups 2 and 3 could make 0-15 correct responses. Groups 1 and 4 could make 0-10 correct responses. Criterion was set at two consecutive perfect trials for each S within the group.

Group I Results (Figure I)

1. In the first testing phase (trials 1-2), Group I made no correct responses to sets IA, IB, IC, ID (Figure IA).

2. During trials 3-14, Group 1 was taught to verbalize Set IA. Criterion performance was attained after 12 teaching trials (Figure IB).

3. Sets IA and IB were tested during trials 15-16. The students maintained perfect responding to Set IA. The number of correct responses to Set IB increased from an average of 0 during trials 1-2 to 7-out of 15 possible-during trials 15-16 (Figure IC).

4. During trials 17-20, Group I was taught to verbalize Set IB. Criterion performance was attained after 10 teaching trials (Figure ID).

5. Sets IB and IC were tested during trials 21-22. Ss maintained perfect responding to Set IB. The number of correct responses in Set IC increased from an average of 0 during trials 1-2 to 6 during trials 21-22 (Figure IE).

6. During trials 23-27, correct responses to Set IC increased in frequency from an average of 6 during trials 21-22 to an average of 8.5 during trials 23-27.

Group 2 Results (Figure II)

1. In the first testing phase (trials 1-2), Group 2 averaged 0 correct responses to Sets IA, IB, IC, ID (Figure IA).

2. During trials 13-16, Group 2 was taught to verbalize Set IA. Criterion performance was attained after 14 teaching trials (Figure IIB).

3. Sets IA and IB were tested during trials 17-18. The group maintained perfect responding to Set IA for one trial then dropped to 14 correct out of 15. The number of correct responses to Set IB increased from 0 during trials 1-2 to 11.5 during trials 17-18 (Figure IIC).

4. During trials 19-20, correct responses to Set IB increased from an average of 11.5 during trials 17-18 to an average of 13.5 (Figure IID).

Group 3 Results (Figure III)

1. In the first testing phase, Group 3 averaged 0, 1, 2, and 1 correct responses to Sets IA, IB, IC, and ID respectively (Figure IIIA).

2. During trials 3-19, Group 3 increased from an average of 0 correct responses during baseline to an average of 11 correct responses during the 17 teaching trials (Figure IIIB).

Group 4 Results (Figure IV)

1. In the first testing phase, Group 4 made no correct responses to Sets IA, IB, IC, and ID (Figure IVA).

2. During trials 3-14, Group 4 was being taught Set IA and averaged 7.8 correct responses. During trials 1-2, Group 4 made 0 correct responses to Set IA (Figure IVB).

Although obtaining 2 component responses was not a terminal objective of the program and teaching of two component responses was not a specifically defined task, the authors noticed a relatively high occurrence of two-component responses on baseline, as compared with the low occurrence of 3-component responses on baseline. Also, two-component responses seemed to reach a parallel criterion of 2 consecutive perfect trials within each group earlier than three-component responses. When graphed, this indeed was the case. Two-component responses (S-V, S-O, V-O) were initially more frequent than three-component responses. The results can be discussed in three ways. First, the program thusfar is a success. Group I reached criterion in Set IA in only 12 teaching trials, Set IB, in 4 teaching trials, and Set IC in only five teaching trials. Generalization here refers to the use of three word utterances to describe situations other than those specifically taught. Some evidence that this kind of generalization was occurring during the program is provided in the results reported above, by the fact that teaching required fewer trials on successive sets. Testing trials also suggest that generalization occurred from one set to the next. The carry-over of responses learned in Task IA of demonstrations to Task IB of photographs was 70% before teaching of Set IB. The pattern of the responses learned in Tasks IA and IB appeared to generalize to the new set of demonstrations in Task IC, with 60% improvement from baseline before teaching. Group 2 similarly reached criterion on Set IA in only 14 teaching trials. Although the data is incomplete on Set IB, a savings of teaching trials is indicated: 2 teaching trials resulted in 13 and 14 correct responses respectively out of 15 possible correct responses. This also suggests generalization, since correct responses increased 89% in Set IB without intervening teaching. Although Group 3 had not completed Set IA, within 17 teaching trials, Ss increased from no 0 correct responses to 14. The authors feel that the delay can be partially attributed to extremely low verbal ability at baseline. One S only had 7.5% of 2 component responses at baseline while another S in this group made no 2-component utterances at baseline. In overall comparison, the 10 S's, together, averaged 22.75% 2-component responses at baseline.

Group 4 only completed 12 teaching trials. However, their responding increased from no three-component response at baseline to 8 by the last teaching session. Because of illness, one S was frequently absent after the program began. Also, of the 2 remaining S's of Group 4, one's acquisition rate appeared lower than the other younger more skilled S. One-component responses, and two-component responses were established earlier than three-component responses. These findings are illustrated in Figures V, VI, VII, and VIII. They appear to confirm Bloom's sequential development of syntax that 2-word utterances develop prior to 3-word utterances. The data indicates that those two-component responses already present were reinforced and that generally their frequency was increased simply by T's model of three-component responses. Thus, it is not necessary to firmly establish two-word utterances beyond 50-60% before beginning a program developing 3-word sentences. Within our sample the highest frequency of 2-component utterances at baseline was 45% for one S. Frequency ranged from 0-45%.

Last, it may be of interest to note that in almost all cases (Figure VA, VIA, VIIA, VIIIA) responses to the concrete demonstrations Tasks IA and IC showed more accuracy than responses to the pictures Tasks IB and ID. Perhaps establishing 3-component responses on the concrete level facilitates establishment of 3-component responses on the more abstract pictorial level.

CONCLUSION

Once criterion is reached for Tasks IA-ID, the next question is where to proceed. However, before program development can be discussed the topic of generalization must be considered. Techniques for the maintenance and generalization of newly acquired speech are as important as those used in acquiring speech (Balfour, 1972). We cannot assume that these learned three word utterances will generalize to new environments with different subject, changing verbs, and new objects. "Generalization should be programmed, rather than expected or lamented" (Baer, Wolf, and Risley, 1968).

To facilitate generalization, the following procedures are recommended in this program:

1. Develop more sets of demonstrable three word utterances.

   a) Subject Change - Use other teachers and students.

   b) Verb Change - Use action verbs which are performed by the teacher or students in the classroom.

   c) Object Change - Use familiar objects common to the child's environment.

2. Shift the program to new environments. Examples are:

   a) Playground: When Mary is jumping rope, tell her "Mary jumping rope" and ask her to repeat it.

   b) Gym - Peter kicking ball.

   c) Home Economics - Sue baking cookies.

   d) Math - Gary counting blocks.

3. Have all teachers in the school continuously model three word utterances. Reinforcement should be given when S imitates the model or when S makes a three word utterance without prompting.

As the student is able to maintain success at this stage, a decision must be made concerning direction of program expansion with three word utterances. Expansions can take many forms. Development of the noun phrase is one possible (Miller, Yoder, 1972). A noun phrase consists of a determiner and noun; with the determiner being an article, adjective, quantifier, or demonstrative adjective (Menyuk, 1969).

This program did not proceed to modifier development for three reasons.

1. Adjectives are learned, for example, by size and color. These are concepts which must be taught in a separate program, not within a developmental language program.

2. The addition of modifiers was not controlled for in the design of Sets 1 and 2.

3. Adjectives would be hard to depict in the pictorial phase of the program.

Because program objectives included increasing the length of the student's utterance, it appears logical to expand the three word utterance by compounding verbs and objects (Sets 3 and 4). The same verbs and objects used in Sets 1 and 2 are combined. This should not make learning more difficult as ease of learning is not believed to be related to such factors as number of words per phrase (Braine, 1971). The sentences developed for Sets 3 and 4 have the same underlying structure as Sets 1 and 2, with one additional rule, subject or object understood (Menyuk, 1969).

This expansion is primarily a more efficient way of speaking. It enables Ss to say someone is performing two actions or working on two objects. For retarded students, as well as most individuals, this expansion is a functional and a more efficient method of speaking and reinforcing three word utterances. Furthermore, this type of expansion facilitates the idea of programmed generalization.

Taking the teaching program the authors have described, along with the developmental sequence referred to in the literature, and adding a little teacher ingenuity, the basis for language development of retarded children can be established and developed by systematic application of behavior principles to what is known about the normal order of language development.

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Group 1 Number of three-component responses

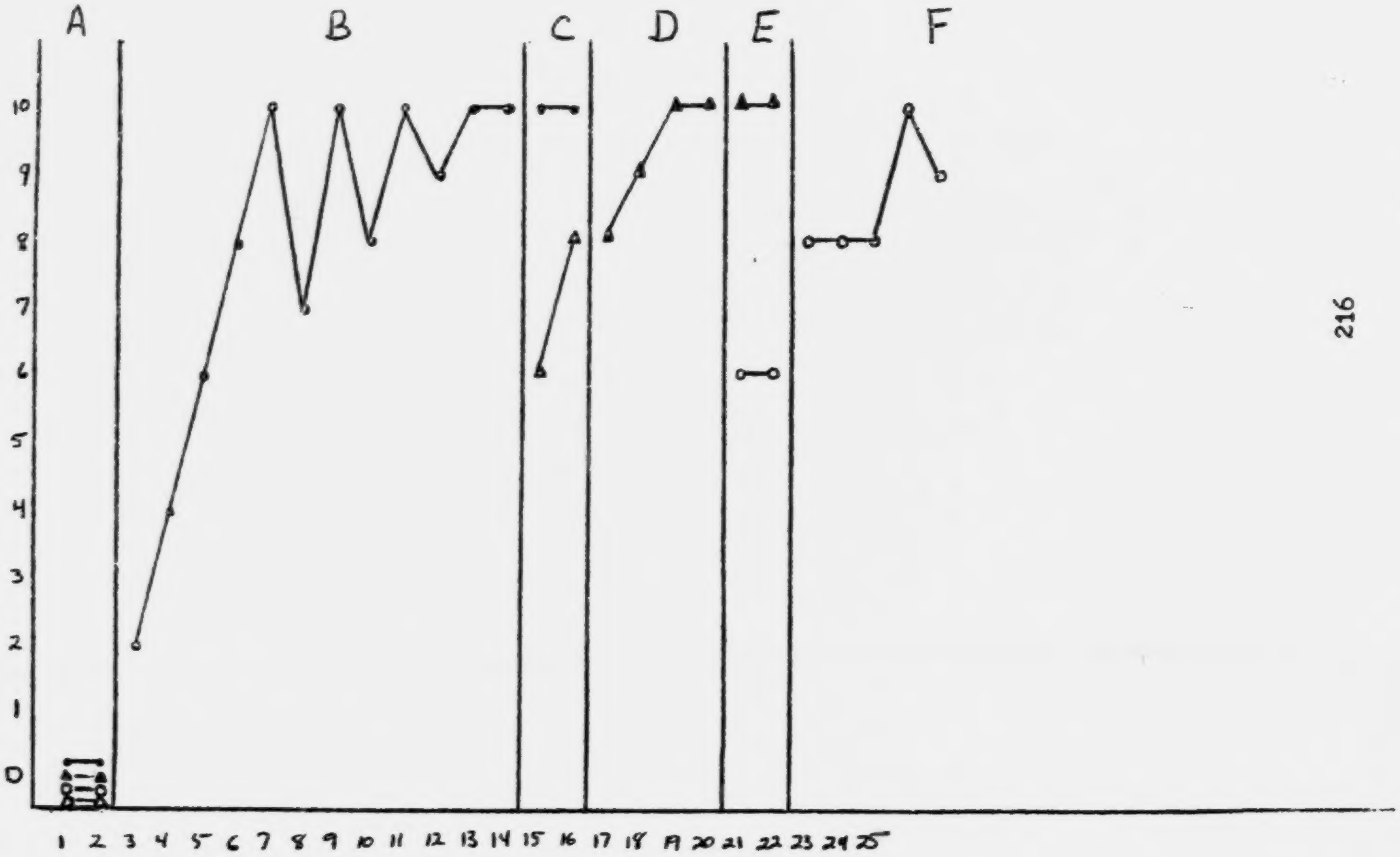
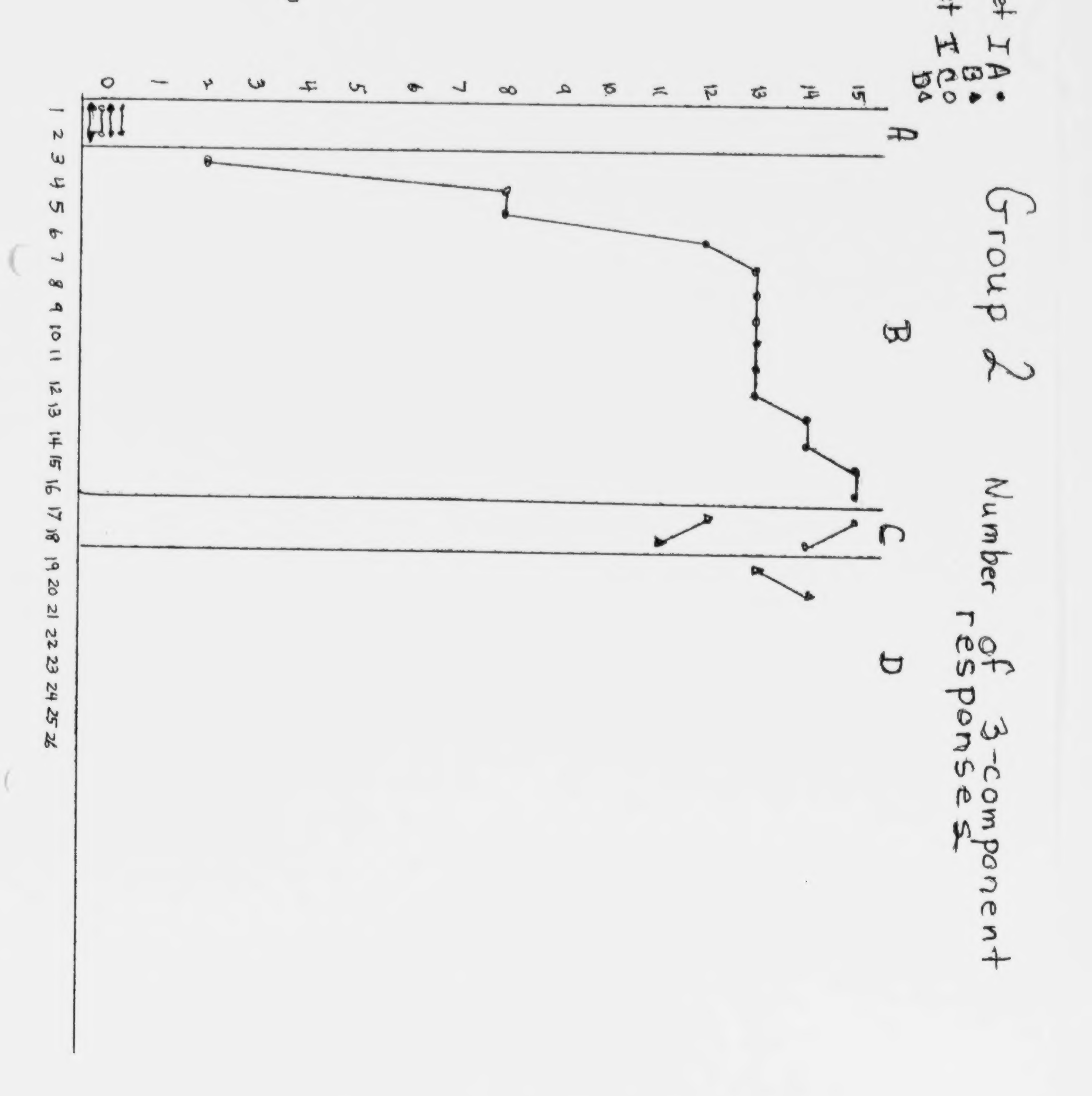


Figure I

Figure II


Group 2
Number of 3-component responses
Set I A ●
B ▲
Set II C ○
D △
A
B
C
D
0
1
2
3
4
5
6
7
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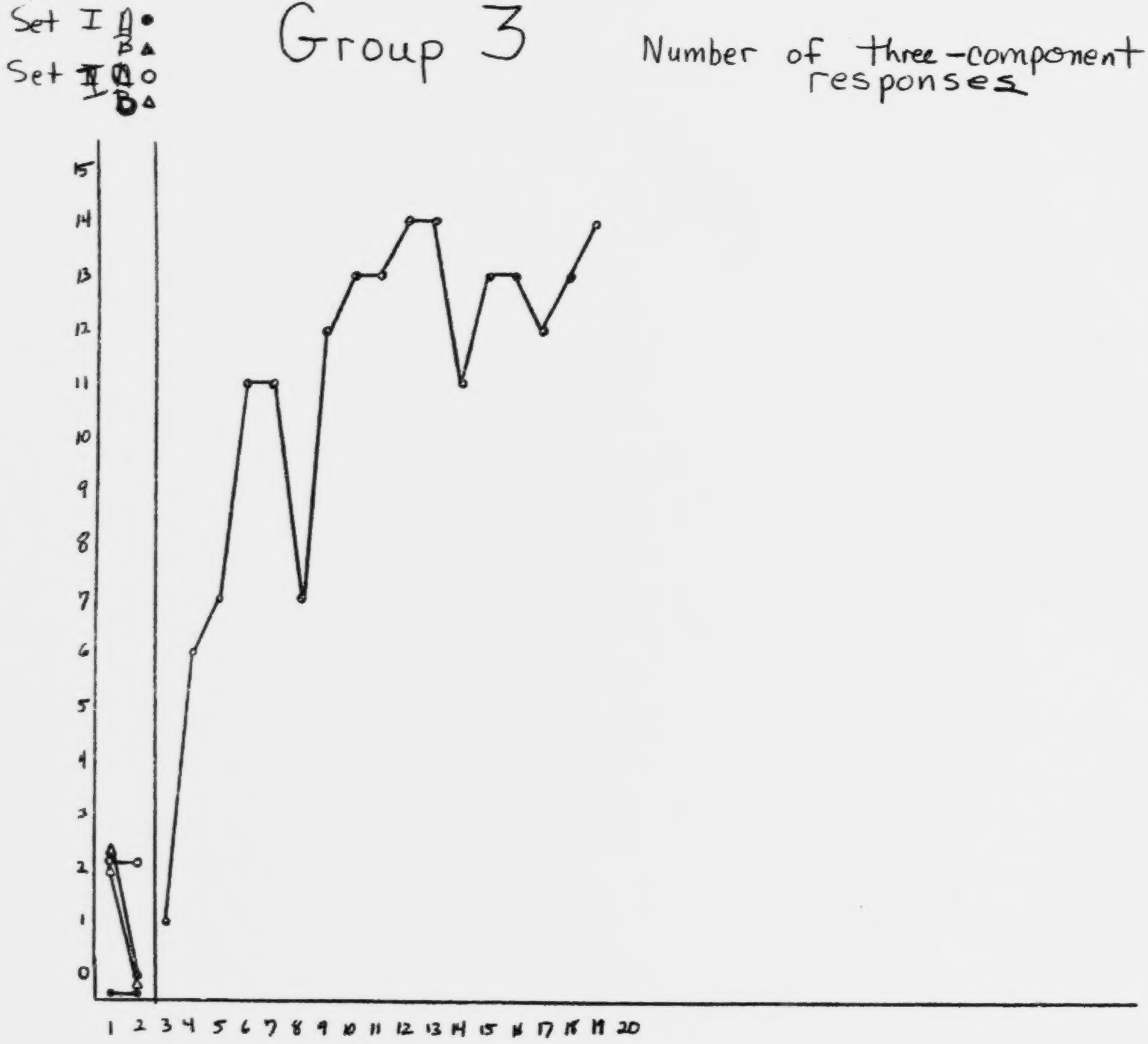
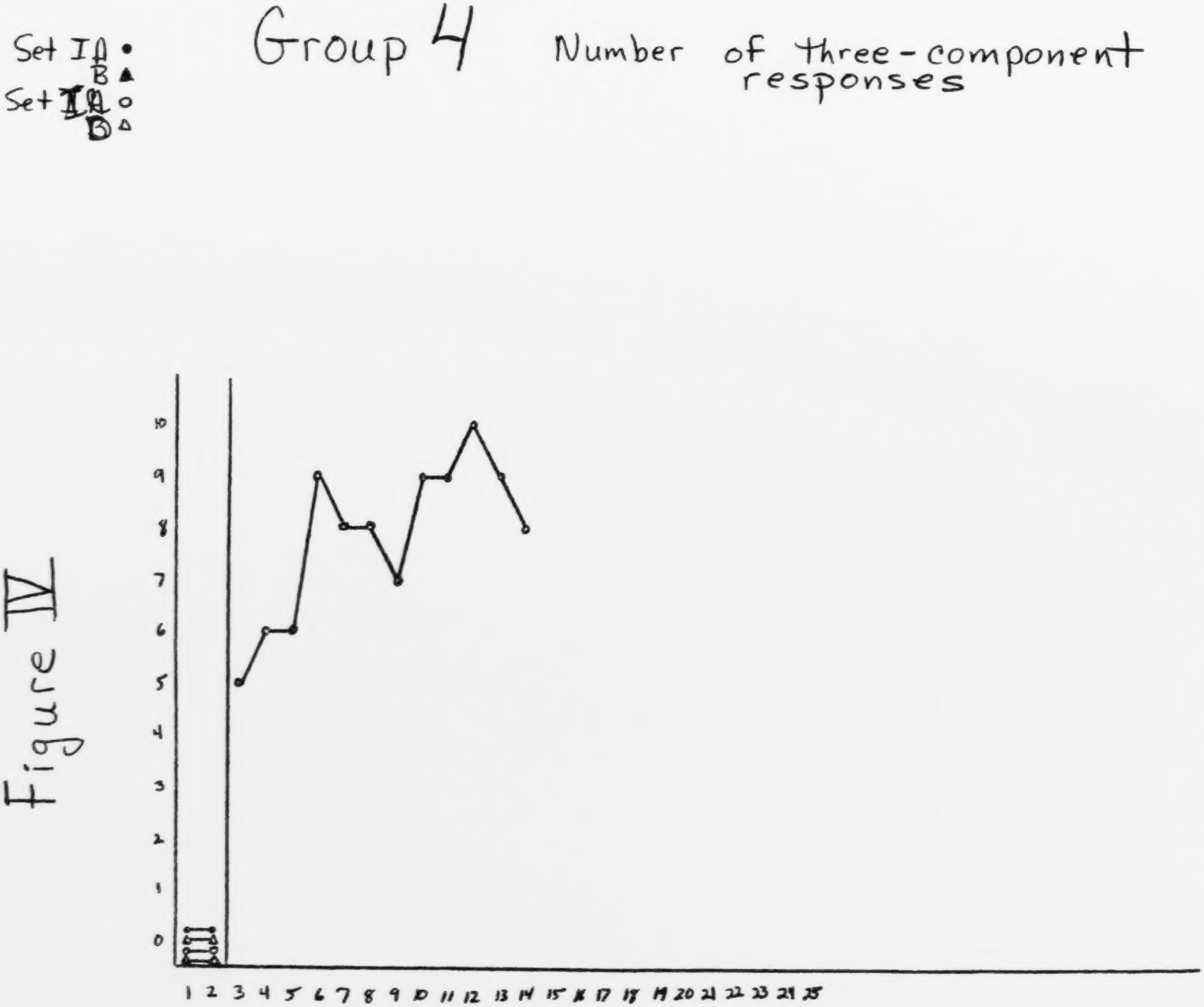

Group 3

Number of three-component responses

Group 4 Number of three-component responses

Figure IV



Group 1

Number of three-component responses ——

Number of two-three—component responses - - - -

Set I A ●
B ▲
Set II A ○
B △

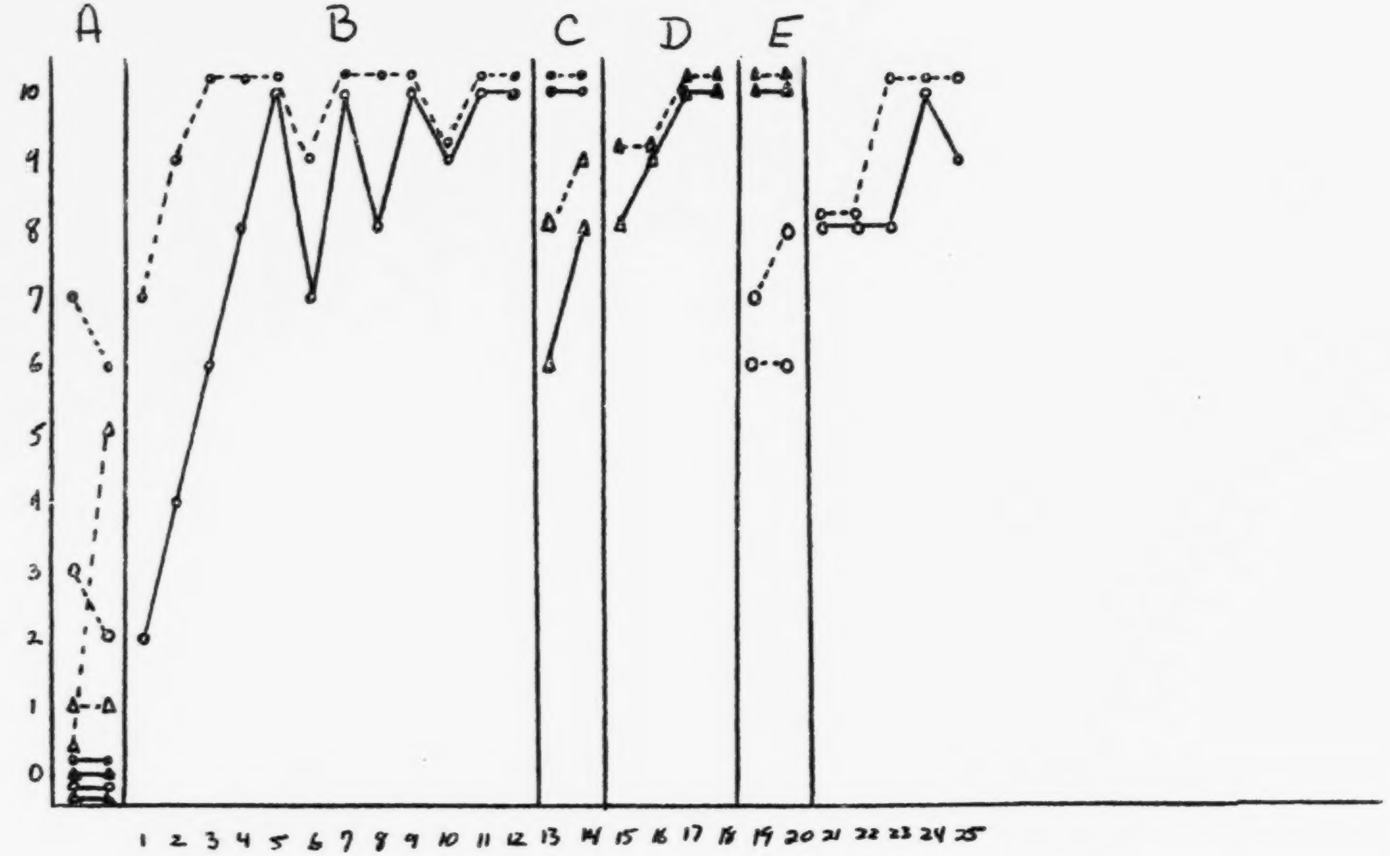


Figure V

Figure VI

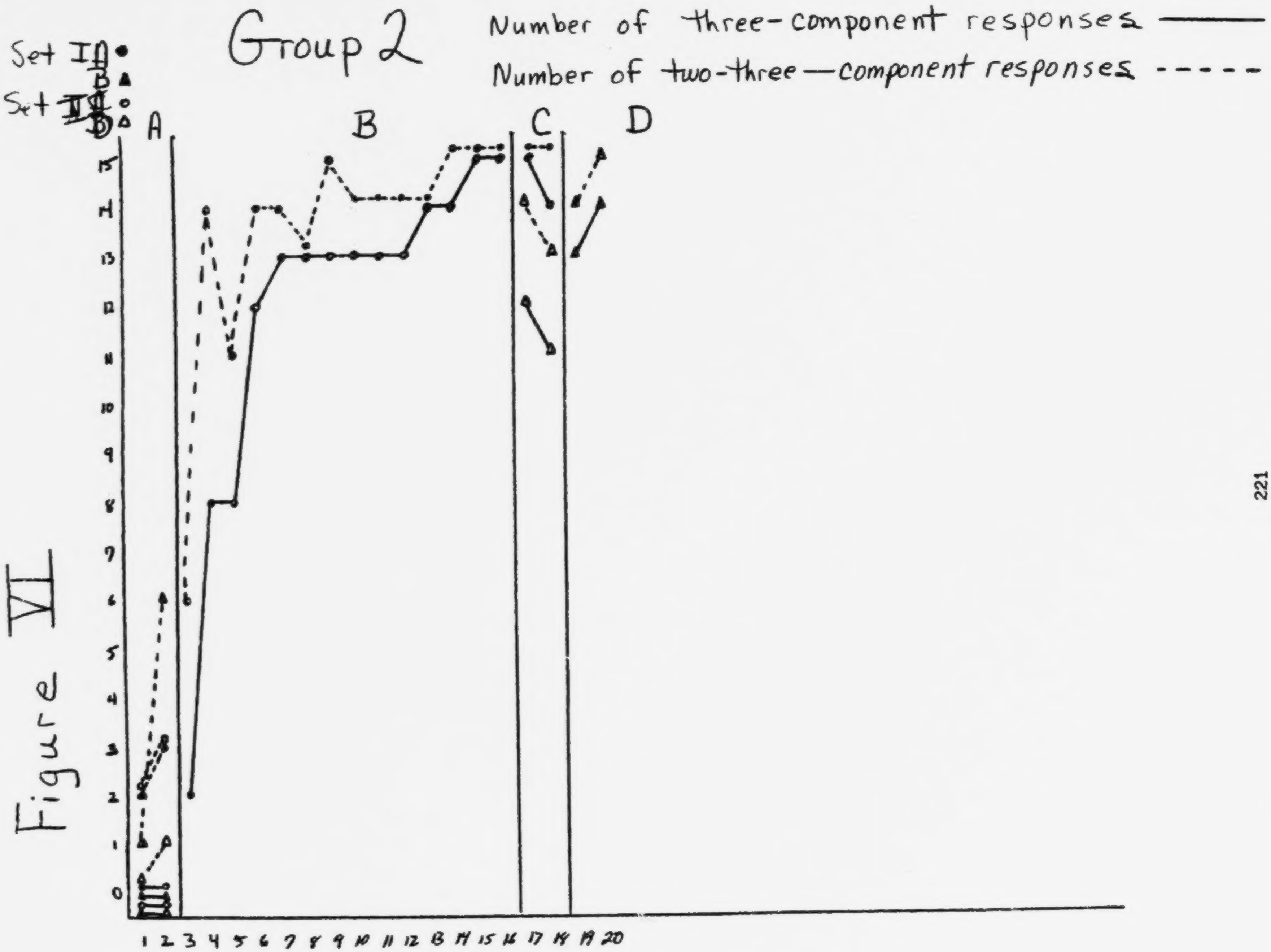
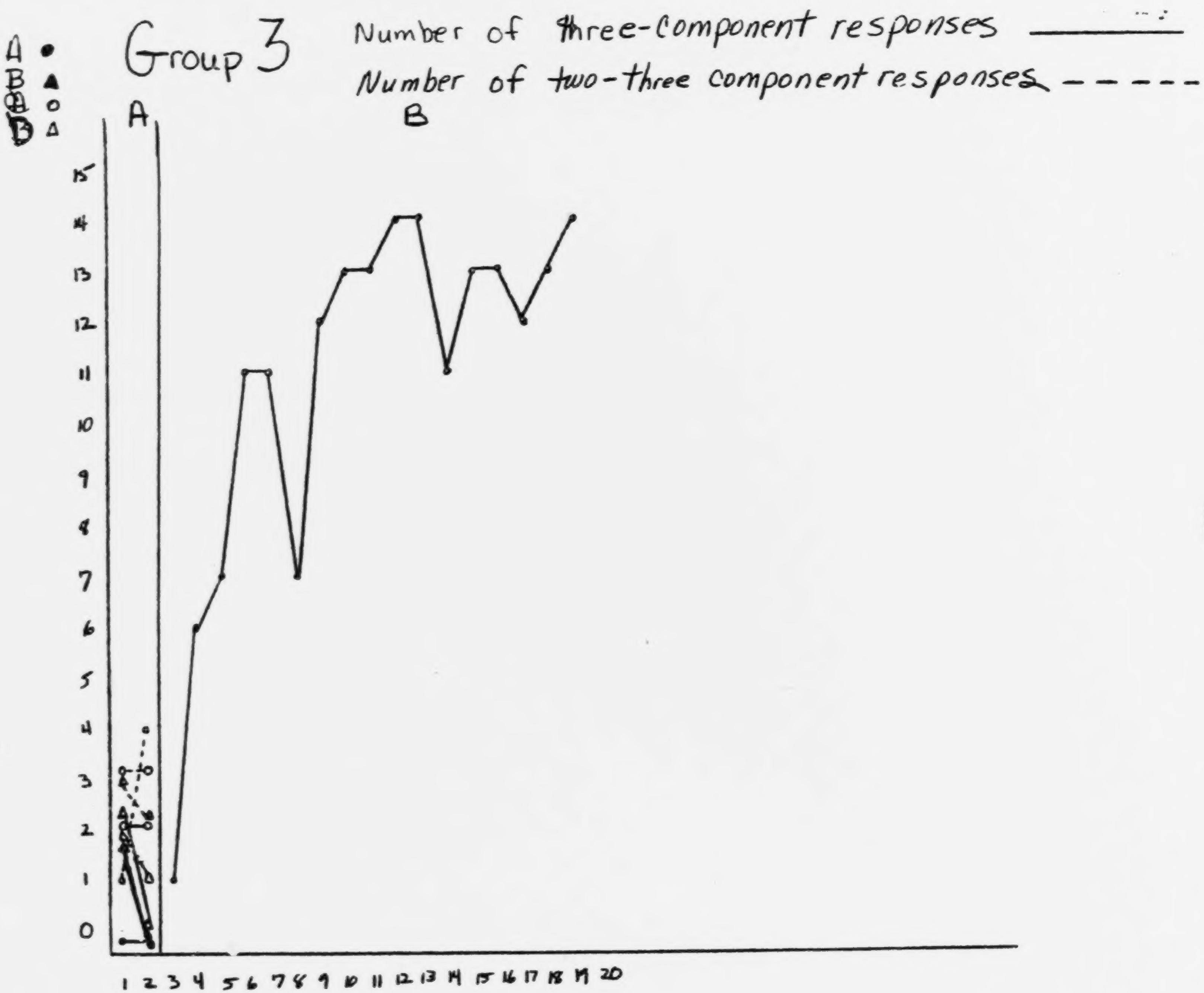

Group 2
Number of three-component responses ——
Number of two-three—component responses - - - -
Set I A ●
B ▲
Set II A ○
B △
A
B
C
D
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Figure VII


Set I A ●
B ▲
Set II A ○
B △
Group 3
Number of three-component responses ——
Number of two-three component responses - - - - -
A
B
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

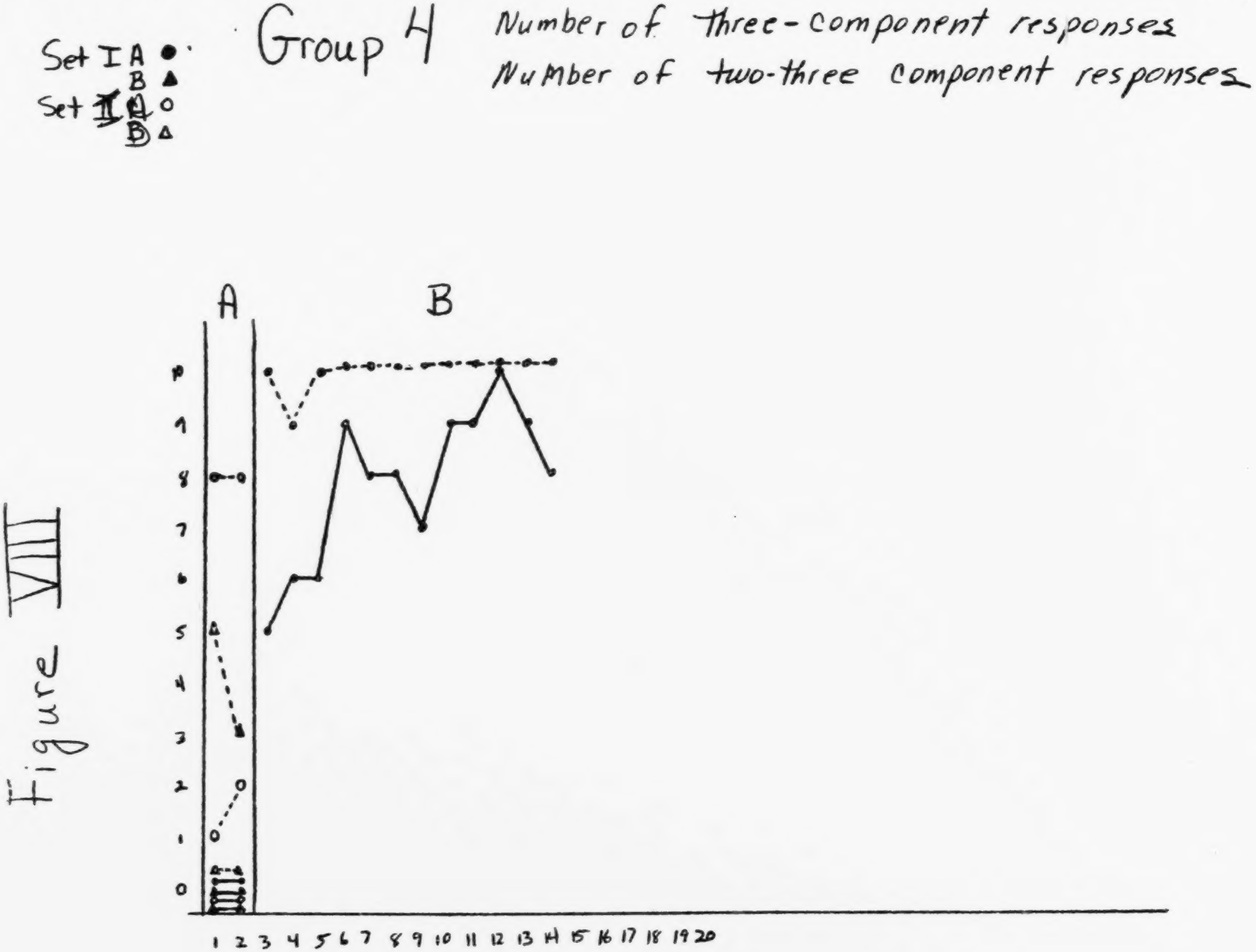

Set I A ●
B ▲
Set II A ○
B △
Group H
Number of three-component responses
Number of two-three component responses
A
B
0
1
2
3
4
5
6
7
8
9
10
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

Figure VIII

Date: Trial: /15

Name		reads	book

Name		pours	water

Name		cuts	paper

Name		draws	flower

Name		breaks	cookie

Date: Trial: /15

Name		reads	book

Name		pours	water

Name		cute	paper

Name		draws	flower

Name		breaks	cookie

Teaching Young Trainable Level Retarded Students To Report Behavioral Events

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University of Wisconsin and Madison Public Schools

Language behavior, at least as the phrase is used here, refers to behavior on the part of a student that communicates information to another person, or behavior on the part of a student that indicates that information has been received. Language behavior deficits are probably the most crucial, pervasive and salient deficits confronted by teachers of trainable level retarded students (Brown, 1972). Unless a teacher can develop a behavioral repertoire in her students that can communicate information to others or that can demonstrate that information has been received, the role of a teacher will be essentially that of a custodian concerned with little more than arranging for physical needs. That is, without language it is extremely improbable that a teacher can develop math, reading, social and vocational skills (McLean, Yoder, & Schiefelbusch, 1972).

The program described here represents an attempt by classroom teachers to develop and/or improve basic communication skills of young trainable level students. The program evolved from the observations of the teachers and, for that reason, it might be of interest to present a brief account of the teachers pre-program experiences.

At the start of the school year the teachers attempted to provide a series of varied and presumably interesting and educational activities. Puppet shows, animal displays, historic demonstrations, films and filmstrips were some of the activities provided in class, and nature walks, trips to the police and fire stations were some of the activities provided away from the school. After the

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This program was supported in part by funds granted to the Madison Public Schools by the State of Wisconsin, Department of Vocational Education and in part by NICHD Grant 5 P01 HD 03352 to the University of Wisconsin Center on Mental Retardation.

students had been exposed to an activity the teacher often would quiz the students as to where they went, what they noticed, what they did, etc. It soon became obvious that either the students did not want to, or did not know how to communicate what they experienced, or that they did not obtain information from the experiences and therefore had nothing to communicate.

Attempts at obtaining information from the students concerning the experiences to which they had been exposed consisted of questions like: What did we do?, Where did we go?, What animals did we see?, What happened?, What did I first do?, etc. Unfortunately, few, if any, appropriate responses accrued and most of the responses provided were incoherent, or unrelated to the experiences provided.

Thus, it was decided to arrange an instructional environment that might contribute to the development of skills that would allow the students to communicate information provided by another person.

While there are many approaches to the development of communication skills it was decided that the program should: A) include clearly discriminable events; B) a large number of training trials; and C) at least initially, be conducted in the classroom by teaching personnel.

As the ability to learn from observing the behavior of another person is a crucial cognitive skill that all students must acquire, it was decided the information to be communicated to the students would come from the teacher. Thus, a series of "behavioral events" were delineated. As verbal communication skills are particular deficits of young trainable level students it was decided that a verbal response would be required as a vehicle for determining if the student obtained information contained in the behavioral events. Thus, we have a situation whereby a teacher would emit a clearly discriminable behavioral event (e.g., comb hair) and then require the students to verbally respond in such a way as to demonstrate that they obtained information from observing the event.

Initially, the behavioral events were quite simple in they involved a small number of actions (one-component behavioral events) on the part of the teacher, the actions were performed immediately in front of the students, and the verbal responses required were relatively simple. Subsequently, the behavioral events became more complex (two-component behavioral events) the events were removed from the immediate presence of the students, and concommitantly the verbal responses required became more complex.

The entire program was divided into the following eleven phases:

Phase I	Two sets of 5 one-component behavioral events were performed by the teacher and the students' ability to verbally report characteristics of the events was measured.
Phase II	The students were taught to verbally report characteristics of one set of one-component behavioral events, but were not taught to verbally report the characteristics of the other set.
Phase III	The ability of the students to verbally report characteristics of the one-component behavioral events not taught in Phase II was measured.
Phase IV	The students were taught to verbally report characteristics of the one-component behavioral events not taught in Phase II.
Phase V	Three sets of 5 two-component behavioral events were performed by the teacher and the students' ability to verbally report characteristics of the events was measured. Two of the three sets of two-component behavioral events were performed by the teacher while she was seated at a table. The third set of two-component behavioral events was performed by the teacher as she walked about the classroom.
Phase VI	The students were taught to verbally report characteristics of one of the two sets of two-component behavioral events performed at the table, but were not taught to verbally report characteristics of the remaining two sets of two-component behavioral events.
Phase VII	The ability of the students to verbally report characteristics of the second set of two-component behavioral events performed at the table, and the set of two-component behavioral events performed about the classroom was measured.
Phase VIII	The students were taught to verbally report characteristics of the second set of two-component behavioral events performed at the table.
Phase IX	The ability of the students to verbally report the characteristics of the three sets of two-component behavioral events was measured.

Phase X	The students were taught to verbally report characteristics of the set of two-component behavioral events performed while the teachers were walking about the classroom.
Phase XI	Retention measures of the students' ability to report the characteristics of two-component behavioral events were obtained.

METHOD

Students (Ss)

The four Ss (S_1, S_2, S_3, & S_4) were enrolled in a public school program for trainable level retarded students. The two female and two male Ss ranged in CA from 8-10 years and psychological reports contained test scores suggesting IQs in a 34-40 range. Evaluation reports contained such labels and descriptions as: Down's Syndrome, severe retardation, severe learning disability, delayed speech and emotional disturbance.

Materials

The materials used in the program were common objects found in the classroom, these objects were incorporated into one and two component behavioral events. The behavioral events (and the required objects) are presented in Table I below:

Pennies were used as consequences for each correct response and saved in paper cups. At the end of each teaching session, each penny was exchanged for one M&M. Data sheets were constructed that provided easy recording of responses to each behavioral event.

TABLE I

BEHAVIORAL EVENTS PERFORMED BY THE TEACHER

Set I

A. Laura squeezed clay
B. Laura combed hair
C. Laura cut paper
D. Laura clapped hands
E. Laura colored balloon

Set II

A. Laura dropped pencil
B. Laura read book
C. Laura ate cookie
D. Laura rolled ball
E. Laura drank water

Set III

A. Laura piled blocks ; Laura blew feather
B. Laura drew circle ; Laura tore napkin
C. Laura buttoned shirt ; Laura tied shoe
D. Laura rang bell ; Laura folded towel
E. Laura opened box ; Laura zipped pants

Set IV

A. Nancy wiped table ; Nancy cleaned hands
B. Nancy threw cup ; Nancy blew nose
C. Nancy turned pages ; Nancy pushed truck
D. Nancy wrote name ; Nancy erased board
E. Nancy raised hand ; Nancy sharpened pencil

Set V

A. Nancy got food ; Nancy fed fish
B. Nancy got water ; Nancy watered plant
C. Nancy got coat ; Nancy put on coat
D. Nancy walked to chart; Nancy read story
E. Nancy closed door ; Nancy turned off lights

Instructional Setting

Two instructional arrangements were utilized. The first arrangement was used for the two sets of one-component behavioral events and two sets of the two-component events which occurred at the teaching table. Teaching was conduced at a table in a corner of the classroom by a student teacher (T) while the six remaining students in the class were involved in activities with the teacher. The four Ss sat directly across from the teacher at the table.

The second instructional arrangement utilized also had the 4 Ss seated directly across from the teacher at the table in the corner of the classroom. In this setting, however, T performed the third set of two-component behavioral events as she moved about the classroom at a distance of 10 to 20 feet away from the teaching table.

Testing and teaching sessions were conducted from 10:20 a.m. to 10:40 a.m. daily.

Teaching Procedures

Phase I When Ss and T were seated around the table, T performed the first behavioral event of Set I (squeezed clay) and said to S_1, "What happened?" The response of S_1 was then recorded on the data sheet. T then performed the second behavior event in Set I (combed hair) and said to S_2, "What happened?" and recorded the response. This procedure was followed until each of the 4 Ss had the opportunity to witness and label each of the 5 behavioral events in Sets I and II on three consecutive occasions.

Phase II Ss were taught to report the behavioral events in Set I but not the events in Set II. Ss were taught to report the events in Set I in the following manner:

Step 1 T said, "John, watch what I do", performed the first behavioral event (squeezed clay) in Set I and then said, "What happened?"

Step 2 If S_1 responded correctly *T* said, "Good, Great, etc.", gave S_1 a penny.

Step 3 If S_1 did not report or responded incorrectly (e.g., Laura, clay, squeezed, or Laura clay), *T* said, "John, watch what I do", performed the event a second time, and then said, "What happened?" If S_1 responded correctly, *T* said, "Good, Great, etc.", modeled a correct response (Laura squeezed clay), so the 4 *S*s could easily hear her but did not present *S* with a penny.

Step 4 If S_1 did not respond correctly to the second performance of the first behavioral event in Set I, *T* modeled a correct response (Laura squeezed clay) and said, "Now say it." If S_1 matched the verbal behavior of *T*, *T* said, "Good, Great, etc.". If S_1 did not match the behavior of *T*, *T* said, "No, I am sorry, you did not say the right words."

Subsequently, the same procedures were applied to *S*s 2, 3, & 4 respectively until all 4 *S*s correctly reported the 5 behavioral events performed by *T* in Set I on three consecutive occasions.

Phase III The procedure described in Phase I were used to measure *S*s ability to report the behavioral events of Set II.

Phase IV The procedures described in Phase II were used to teach *S*s to report the behavioral events in Set II.

Phase V The procedures described in Phase I were used to measure *S*s ability to report the events in Sets III, IV, & V with two exceptions.

First, the behavioral events in Sets III involved two rather than 1 component. Second, the behavioral events in Set V were performed by T as she walked about the room.

Phase VI The procedures described in Phase II were used to teach Ss to report the behavioral events in Set III.

Phase VII The procedures described in Phase I were used to measure Ss ability to report the events in Sets IV & V.

Phase VIII The procedures described in Phase II were used to teach Ss to report the events in Set IV.

Phase IX The procedures described in Phase I were used to measure Ss ability to report the events in Sets III, IV, & V.

Phase X The procedures described in Phase I were used to teach Ss to report the events in Set V.

Phase XI The procedures described in Phase I were used to measure Ss ability to report behavioral events of Sets III, IV, and V two weeks after Phase X had been completed.

RESULTS

Correct responses to questions related to one-component behavioral events (Phases I through IV) were operationally defined as follows: A response on the part of an S that included: A) a subject (e.g. Laura), a verb (e.g. squeezed), and an object (e.g. clay); B) a subject (e.g. Laura), and a verb (e.g. combed); and C) a verb (e.g. drank), and an object (e.g. water).

Correct responses to questions related to two-component behavioral events (Phases V through X) were operationally defined exactly as the one-component behavioral events except that an S was required to meet one of the criteria listed above in each of the components. For example, if the two-component behavioral event was "Nancy raised hand; Nancy sharpened pencil", a response was not considered correct unless S included a subject, verb and object, a subject and a verb, or a verb and an object when reporting each of the two events.

In any given trial each S could make from 0 to 5 correct responses to any given Set of events and the four Ss combined could make from 0-20 correct responses.

As can be discerned from Figure I, during Phase I, Ss made 1, 4, and I and 3, 4, and 0 correct responses to questions related to Sets I and II respectively.

As can be discerned from Figure I, during Phase II, 12 teaching trials were required before each S could report the behavioral events in Set I on three consecutive occasions.

In Phase III, Ss made 5, 7, and 5 correct responses to questions related to Set II. When performance on Set II, in Phase III is compared with performance on Set II in Phase I, a slight increase in correct responding can be discerned.

In Phase IV, 5 teaching trials were required before each S could report the behavioral events in Set II. Obviously, Ss learned to report the events in Set II in substantially fewer trials required to learn Set I.

As can be discerned from Figure I, during Phase V, Ss made 0, 0, and 0; 0, 0, and 0; and 0, 0, and 0 correct responses to questions related to Sets III, IV, and V, respectively.

In Phase VI, 11 teaching trials were required before each S could report the behavioral events in Set III on three consecutive occasions.

In Phase VII, Ss made 2, 3, and 2 and 0, 0, and 0 correct responses to questions related to Sets IV and V respectively. When performance on Set IV, in Phase VII is compared with performance on Set IV in Phase V, a slight increase in correct responding can be discerned. There is no difference in performance on Set V between Phase VII and Phase V.

In Phase VIII, 12 teaching trials were required before each S could report the behavioral events in Set IV on three consecutive occasions. Therefore, the same amount of trials were needed by Ss to learn to report the events in Set IV as it did to learn Set III.

In Phase IX, Ss made 19, 20, and 19; 20, 19, and 20; and 1, 1, and 1 correct responses to questions related to Sets III, IV, and V, respectively. Obviously there was almost perfect retention of the correct responses to the behavioral events in Set III. Ss also maintained performance on Set IV. There is no apparent difference in performance on Set V between Phases V, VII, or IX.

In Phase X, 8 teaching trials were necessary before each S could report the behavioral events in Set V on three consecutive occasions. It can be discerned that Ss learned to report the events in Set V in fewer trials than were required to learn Set III or Set IV.

In Phase XI, Ss made 20, 17, and 17 correct responses to the behavioral events in Sets III, IV, and V after a two-week retention period.

DISCUSSION

Inspection of Figure I strongly suggests that, in accordance with the definition offered, four young trainable students acquired the skills necessary to report verbally both one and two-component behavioral events which occurred in their immediate presence, and two-component behavioral events which occurred throughout their classroom.

In addition, it appears that as the program progressed and thus became more difficult, the students became more efficient at learning the required response patterns. For example, in Phase II which involved teaching responses to the one-component behavioral events the students reached criterion after 12 teaching trials whereas in Phases VI and VIII which involved teaching responses to two-component behavioral events which occurred immediately in front of as well as around the room a total of 11 and 12 teaching trials respectively were required.

When the components of the program described thus far had been completed, it was decided to attempt to investigate whether the skills acquired could be made to occur during more natural school activities. Six activities were selected: hand writing, chart reading, math, milk break, auditory training, and gym and two sets of three two-component behavioral events were arranged. While these activities were in progress the teacher would say for example, "Ricky, watch", secure the pointer and read the chart, or get a container of milk and open it, or get a basketball and shoot it. Only two of the four students were selected for this extension and three different teachers (teacher, aide and student teacher) asked the questions and scored the responses. Using the same criteria of a correct response to the two-component behavioral events, a total of five teaching trials were required before the two students performed perfectly on the two sets of two-component behavioral events. Thus, it would appear if environmental demands are made on the students that require them to report behavioral events in the natural environment, they are capable of meeting such demands.

The criteria used to define correct responses were quite arbitrary and in retrospect appear to have been inhibiting. The rationale for the definition went something like the following: Here are a group of children who apparently are not communicating very well with people in their immediate environment. It is crucial that they be taught to communicate. Furthermore, if it is crucial that they be taught to communicate, it is of sufficient importance that their ability to communicate be verified empirically. The demands that the existence of the communication skills in question be verified empirically placed, at least temporary, constraints upon the structure of the program. For example, it was decided that both the behavioral events as well as the responses required be held constant. That is, the behavioral event was repeated until each student responded in a manner prescribed by the teacher. Ultimately, all students met the prescribed response criteria. However, there were situations where the constraints of the program seemed to have prevented individualized responses. For example, in the extension to the program the students were taken to the gym. During the gym period the teacher said, "David, watch" and then went to the wall, picked up a basketball, walked to the basket, shot the ball, missed and said to the student, "What happened?". The program required that the student say, "Nancy got ball, Nancy shot basket" in order for the response to be scored correct. The students response, which had to be scored incorrect was, "Ha, Ha. Nancy missed". Obviously, the student attended to the behavioral event, and communicated what he felt was the substance of that event. The incorrectness of the response was a function of the program rather than of the ability of the student to communicate. While it is quite doubtful that the student would have made that particular response before he received the training in the program, his response clearly indicates that the response criteria of future programs must be improved. Programs are now being designed that hopefully will provide the students with basic expressive skills and yet allow for more individualized responses.

In addition to the quantitative changes there seemed to have been qualitative changes in the students' behavior as well. For example, prior to the start of and during the initial stages of the program, it would have been difficult to claim that the students were attending to the behaving teacher. That is, often times they would look out of the window, down at their hands, or at one another instead of at the teacher. By the end of the program a dramatic change in their attending and tracking skills had accrued. According to subjective reports of the teacher these improvements in attending and tracking skills seemed to have generalized to other instructional programs.

Qualitative improvements in the verbal repertoire of the students seemed to have occurred also. For example, at the start of the program the students responded often times with a blank stare, incoherent verbage, irrelevant words and monosyllables. During the final phases of the program the students rarely responded with less than five intelligible words.

Two glaring examples of qualitative changes in verbal behavior were demonstrated by Ed and David. First, during an unstructured period at the beginning of the day, students were asked such questions as, "What did you do last night?", "What did you eat for dinner?", or "What happened at your house?". In the initial phases of the program, Ed would respond with blank stares or irrelevant verbalizations ("fire engine") to such questions. At the end of the program Ed was making relevant responses using complete phrases. For example, when asked one day, "What did you do at home?", Ed responded, "Daddy chase dog, throw stick, dog run to stick." Second, one day David was absent. When he arrived at school the following day the teacher asked him why he was not in school the previous day. He responded with, "Me sick, Mommy take me nurse, Nurse shot butt." Such complete verbalizations had not occurred before the program had been initiated.

Finally, it appears that an instructional procedure has been delineated and applied by classroom teachers that has resulted in young trainable level students acquiring basic communication skills. This, in itself, provides a much needed note of optimism to public school programs for young trainable level students.

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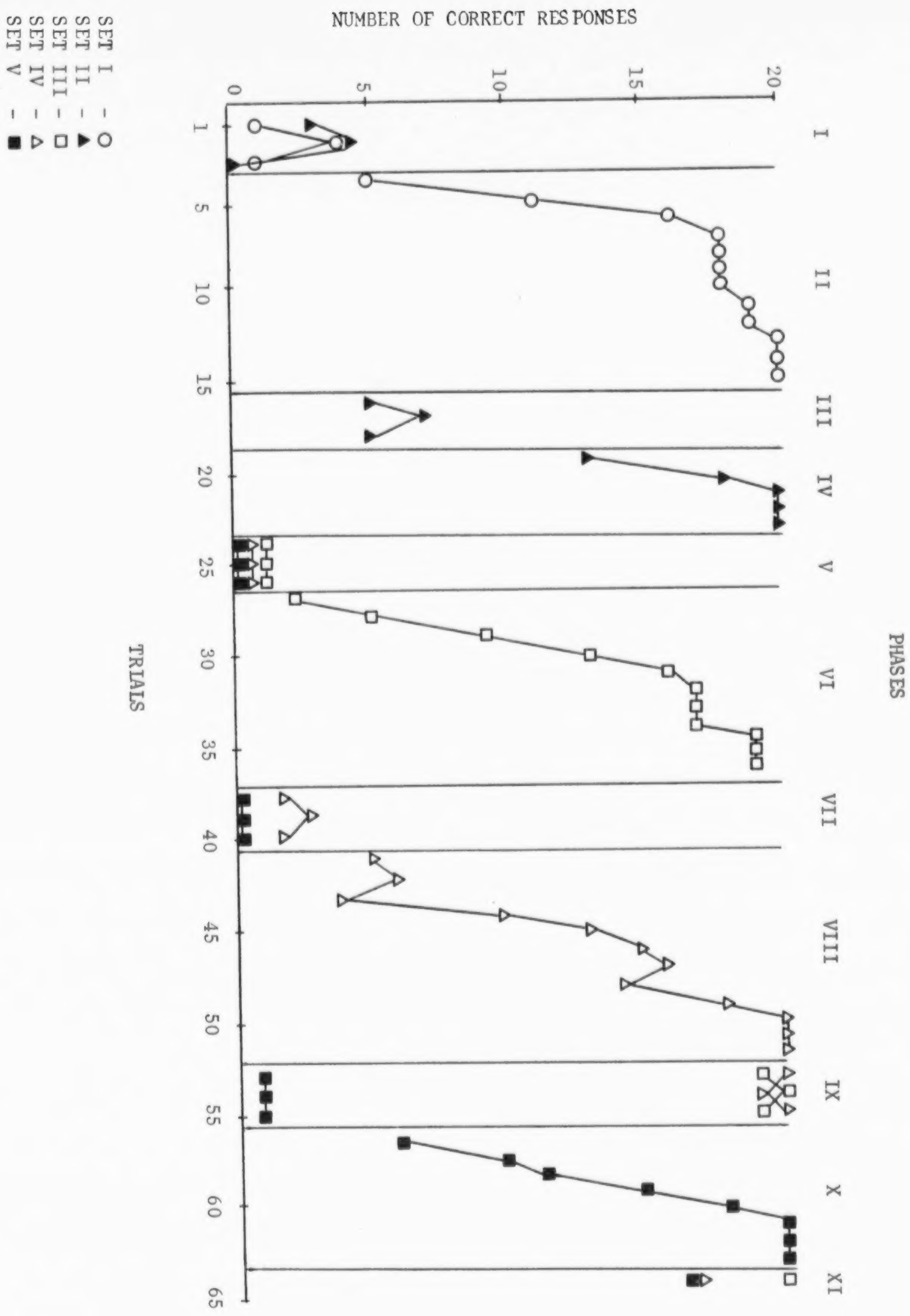
Figure 1 Total number of correct responses made by 4 Ss during Phases I through XI.


NUMBER OF CORRECT RESPONSES
0
5
10
15
20
TRIALS
1
5
10
15
20
25
30
35
40
45
50
55
60
65
PHASES
I
II
III
IV
V
VI
VII
VIII
IX
X
XI
SET I – ○
SET II – ▲
SET III – □
SET IV – △
SET V – ■

Use Of A Fading Procedure To Increase Independent Work Behaviors Of A Student In A Special Class

Richard Schwartz and Tom Bellamy

This paper details an instructional problem and a procedure for alleviating the problem. A student in a special education class completed assigned work when given individual attention by the teacher, but when alone or in a group she seldom worked at all.

A fading procedure was used to alleviate this problem. Fading refers here to gradually removing one stimulus that exerts powerful discriminative control over a behavior while another stimulus gradually acquires greater power of discriminative control. Discriminative control over a behavior is the increased probability that the behavior will occur in the presence of a given stimulus (Kanfer and Phillips, 1970). Informal observations suggested that the teacher's proximity to the student and the teacher's comments to her exerted powerful discriminative control over her behaviors of completing assigned work. However, normal classroom events, such as the teacher's explanation of an assignment or the presence of work on the student's desk exerted little or no discriminative control over these behaviors. The procedure described here was designed to gradually reduce the teacher's individual comments and proximity to the student and to gradually increase the discriminative control of normal classroom events over work behaviors.

METHOD

Student (S) and Surroundings

S was 11 years, 7 months old at the inception of the program. She was

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This program was supported in part by funds granted to the Madison Public Schools by the State of Wisconsin, Department of Vocational Education and in part by NICHD Grant 5 P01 HD 03352 to the University of Wisconsin Center on Mental Retardation.

placed in a public school special education program for trainable level mentally retarded and severely emotionally disturbed students. In the last few years, S has refused to respond to numerous psychometrists, so no IQ score is available. She has been diagnosed as cerebral palsied and aphasic, and labeled emotionally disturbed and learning disabled. For the past three years, teachers and other school personnel have described her behavior as follows: "...it is difficult to get her attention focused on a task and even more difficult to hold it for more than a few minutes;" "...rarely sits down in class;" "she will follow directions only for a brief period;" "low level of attending behavior, no positive interaction with peers, very little communicative language." S was previously involved in an academic program that required a written response to a verbal cue, that is, a spelling program.

Materials

1. Four stopwatches
2. A hand counter
3. Edibles, which were used as incentives
4. Marks on the floor indicating: a) the position of S in desk; b) area three feet and closer to S; c) area three to six feet from S; d) area greater than eleven feet from S.
5. Pencil for use by S
6. A set of 22 pictures, one each on separate 8½" x 5½" sheets of paper, with a horizontal line below the picture, on which S was instructed to respond with a written description of the picture. The pictures were randomized in sets before being presented to S. The pictures were drawings of: coat, hat, pin, fan, mat, pan, pants, mittens, fish, clock, eyes, book, chair, table, ear, tree, apple, knife, fork, spoon, ham, and cup.

Observation and Measurement

Each trial consisted of a seven minute period in which S was asked to complete as many pictures as possible by writing the name of each picture on the line provided. Anything written by S on the picture sheet was recorded as a response. A correct response was defined as a word spelled correctly, written on the picture sheet, that described the picture.

Prompts were used during the program to induce responding. The prompt was T's comment, "Write it in." Prompts were provided during Phase I at the clinical judgement of the teacher, but never occurred more than once in a 30-second period.

A proximity function was computed by assigning weights to the number of minutes spent by T in certain areas of the classroom. T used stopwatches to measure time spent within 3 feet of S, 3-6 feet away from S, and more than 11 feet away from S. Time spent in each area was multiplied by its assigned weight. For example, the maximum value of the proximity function was 21:

0-3 Feet: 0 minutes X (1) = 0
3-6 Feet: 0 minutes X (2) = 0
11 Feet: 7 minutes X (3) = 21

T maintained daily records of number of responses, number of correct responses, number of prompts, and the proximity function.

Baseline

During baseline and in all subsequent trials, a stack of picture sheets was placed in front of S with the instruction, "Write the names of as many of these pictures as you can." S was allowed to work for exactly 7 minutes. During baseline responses were measured under two conditions. Condition A consisted of three trials during which T was within three feet of S for the entire trial. Condition B consisted of three trials during which T was in the area greater than eleven feet from S for the entire trial. Edibles and compliments were given S following every response in both baseline conditions.

Phase I

S was given incentives after all responses. T was faded from the area within three feet of S to the area greater than eleven feet from S, and gradually eliminated all prompts.

Phase II

S was given incentives only after correct responses. T remained at least 11 feet from S in Phase II and did not provide prompts.

Phase III

S was given incentives only for correct responses as in Phase II. In addition, S was given a five minute teaching period by T before every trial. T presented a picture sheet which S had incorrectly responded to in the previous trial. The correct response was modeled by T on the picture sheet. S was then instructed to respond on the back of that picture sheet. As many picture sheets (that S had previously responded to incorrectly) were presented as possible during the five minute teaching period. A trial followed within one minute after the teaching period.

RESULTS

The program required twenty-four trials; Phase I, trials 4-16, during which inventives were given for responses, Phase II, trials 17-22, during which incentives only were given for correct responses, and Phase III, during which only correct responses were given incentives and five minute teaching periods were employed.

In Phase I S's response rate increased from 15 in trial 4 to 21 in trial 16. In trial 4 the proximity function was 8.55, but by trial 10 the maximum value for the proximity function was obtained. This condition remained through the rest of Phases I, II, and III. In trial 12, the number of prompts were reduced to zero (from 9 in trial 4), and this condition remained through the rest of Phases I, II, and III.

The number of correct responses vacillated between two on trial five, to ten on trial nine in Phase I. Under differential reinforcement in Phase II, correct responses increased to fifteen on trial twenty-two. After the five minute teaching periods in Phase III, number of correct responses increased to sixteen.

Number of responses in Phase I increased from fifteen on trial four to twenty-two on the sixteenth. In Phase II number of responses climbed to thirty on trial twenty two. In Phase III response rate fell to twenty-five on trial twenty-four, although the correct rate remained at sixteen.

DISCUSSION

The fading procedure was successful. At the outset of the program S performed assigned work when given individual attention, but did not work when left alone. The teacher's presence and comments were gradually removed, and S's continued responding suggests that the defined work behaviors are under the discriminative control of other classroom stimuli.

One interesting point raised by the data is that differential reinforcement for correct responding provided in Phase II was sufficient to increase the number of correct responses, but did not improve the percent of responses that were correct. That is, both correct responses and total responses increased under this condition. This is consistent with available evidence on thinning schedules of reinforcement (Ferster and Skinner, 1957) and suggests that S did not learn to discriminate correct from incorrect responses. Direct teaching procedures were therefore used in Phase III, and the limited results that are available suggest that improvements did result in the percent of responses that were correct.

The data resulting from this program is correlational and conclusions should remain tentative. It is of substantial clinical importance, however, that the student has demonstrated the ability to work independently in a classroom situation. Some academic behaviors that are needed for success in the special classroom are in the students' repertoire, and they have in this instance be brought under the control of appropriate classroom cues.

REFERENCES

Ferster, C. B. and Skinner, B. F. Schedules of Reinforcement. New York: Appleton-Century-Crofts, 1957.

Kanfer, F. H. and Phillips, J. S. Learning Foundations of Behavior Therapy. New York: John Wiley and Sons, Inc., 1970.

LIST OF FIGURES

Figure I - Number of prompts made by the teacher during each trial.

Figure II - Proximity function showing teacher's nearness to the student during each trial. The maximum value of the proximity function was attained when the teacher remained at least 11 feet from the student throughout a trial.

Figure III - Total number of responses made by the student during: A) Baseline condition A (○) and Baseline condition B (●); B) Phase I; C) Phase II; and D) Phase III.

Figure IV - Number of correct responses made by the student during: A) Phase I; B) Phase II; and C) Phase III.

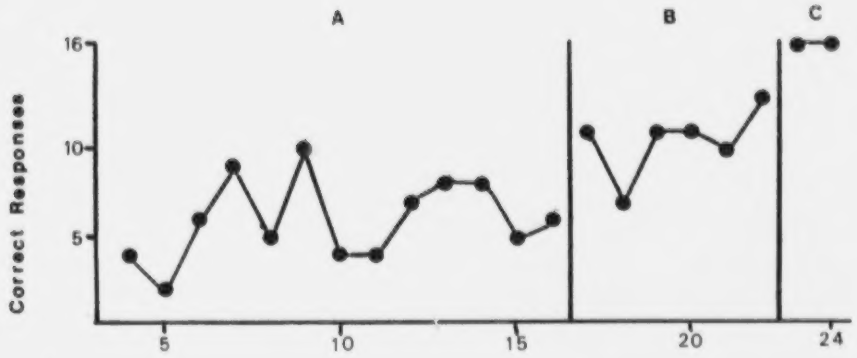
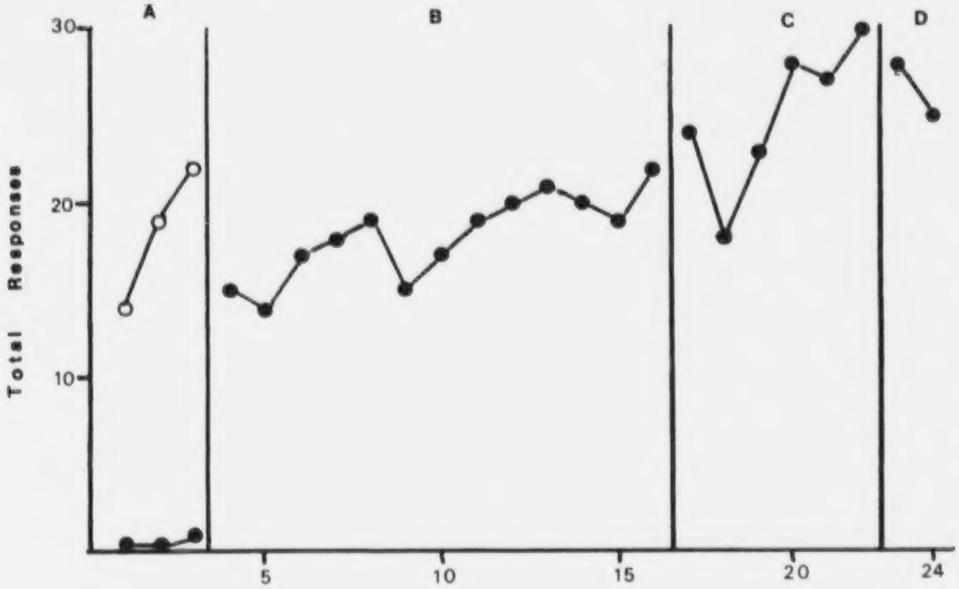


FIGURE IV



FI GURE III

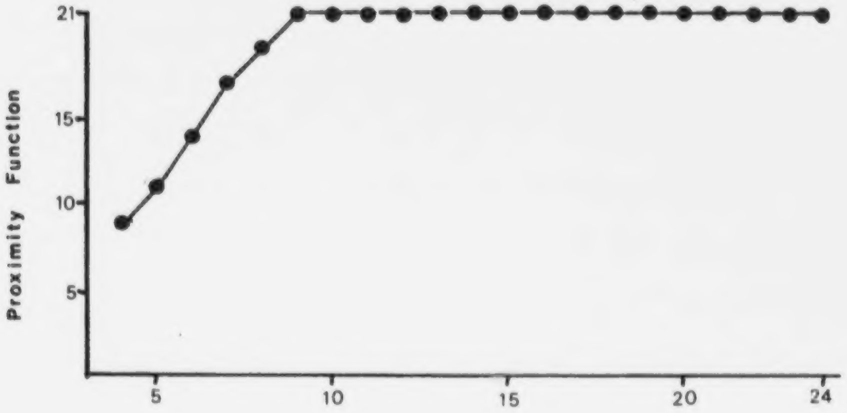


FIGURE II

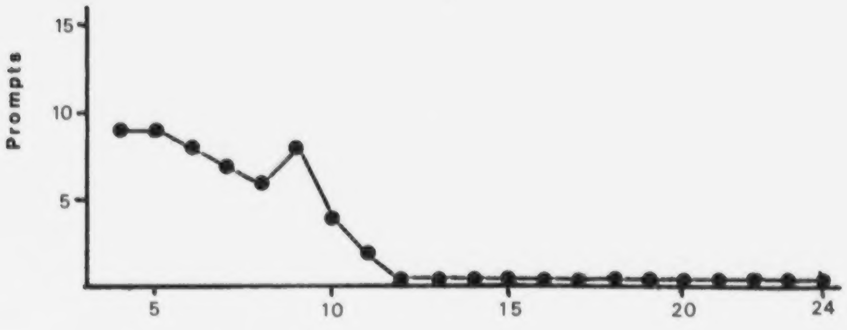


FIGURE I

Introduction

Home Living Skills

It is assumed that there are probably a finite number of skills many trainable level students can be taught to perform that will allow them to function effectively in a home living setting. Obviously, if the students are ultimately placed in regimented dependency demanding residential institutions, the time, effort and expense of teaching home living skills will have been for naught. On the other hand, if our society continues to move toward lifetime community based living arrangements, the development of effective home living skills can enhance significantly the probability that the students will be able to lead more normal, independent and satisfying lives.

The primary purpose of the home living component of the Badger school program is to provide all students with as many home living skills as possible and practical in a public school setting in the hope that the more skills students can perform effectively the greater are their chances of survival in a community setting.

Thus, attempts have been made to delineate many tasks necessary to effectively manage an independent living arrangement: making beds, grooming, dressing, ironing, cooking, laundering, sewing, cleaning dishes, vacuum cleaning, sweeping, etc. Each of these (and other) tasks have been divided into components and arranged in a series. Attempts are now being made to develop an instructional technology that will enable a teacher to teach the requisite skills.

In Part I of this series, several home living programs were described in some detail (Brown, Bellamy, and Sontag, 1971). The programs presented here are, in effect, a continuation of those presented in Part I. In no way should it be construed that the home living skills reported here were the only skills taught to the students during the past year. Rather, it should be realized that the programs reported here are examples of programs being implemented at Badger school. The primary purpose of presenting these programs is to communicate to the readers examples of what, and how specific home living skills are being developed. However, the reader might find information in the programs described that might facilitate the development of home living skills in the students in her charge.

In the future it is anticipated that the Badger staff will be able to report the successful completion of more comprehensive and more complex home living programs.

L.B.
E.S.

Teaching Trainable Level Retarded Students To Use A Kitchen Stove

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The purpose of this program is to delineate a sequence of procedures that can be used to teach trainable level retarded students to use a stove. In order to use a stove the students must be taught at least the following behaviors:

A) to read the words or symbols on the stove;
B) to make position discriminations (left, right, front, rear, left rear, right rear, etc.);
C) to correlate a dial on the display board of the stove with a surface burner;
D) to adjust the dials to the appropriate degree.

The entire program was divided into eight arbitrary steps. The specific components of each step, how each step was taught, and the materials required are presented below. In addition, the data sheets used to record each students progress is attached. All instruction occurred in group settings. That is, groups of 4-5 students stood around the stove and took turns responding.

RESULTS

A total of 22 boys were enrolled in the program and 20 reached criterion on all eight steps. The program will be modified in the future in an attempt to teach the 2 students who did not learn the steps as they are described here.

To include graphs depicting the progress of each of the 22 students would be redundant and irrelevant. Thus, only two performance graphs are included. The first (Figure I) represents the performance of a student who completed the program and the second (Figure II) represents the performance of a student who did not complete the program.

	What was taught	How it was taught	Materials
Step 1	Position on stove of right, left, front, & rear.	1. Ask S "which are the right burners"? left front rear 2. If correct, socially reward him and score +. 3. If incorrect, MODEL the correct response. Say "No, these are the right (left, front, rear) burners". Say it and point (S repeats) 4. Ask S again "which are the right (left, front, rear) burners"? 5. If correct praise him. If incorrect PRIME the correct by taking his hand and touching the correct burners and saying "These are the right (left, front, rear) burners". Say it. Reinforce saying it. 6. Repeat all 4 requests until S answers all 4 correctly, 3 days in a row. 7. Reinforcement - At end of 4 questions 1¢ per 1 correct answer.	4 burners on stove.
Step 2	Vocabulary of right, left, front, rear (reading words on stove).	1. Point to word on panel of stove (covering up distracting words). Ask S "What does this word say"? 2. If correct, praise S and score +. 3. If incorrect, MODEL correct response by saying "No, this word says right (left, front, rear)". You say it. 4. Ask S again "What does this word say"? 5. If correct praise him, but if incorrect repeat "This word says ____". Say it with me! You say it. 6. Repeat all 4 requests until S answers all 4 correctly, 3 days in a row. 7. Reinforcement, 1¢ per 1 correct response.	Panel on stove, containing words: left, right, front, rear.
Step 3	Vocabulary of: left front left rear right front right rear (reading words on stove).	1. Point to words on panel of stove (covering up distractors). Ask S: "What does this say?" 2. If correct, praise S and score +. 3. If incorrect, MODEL correct response by saying "No, this says left front (left rear, right front, right rear)". You say it.	Panel on stove containing words: left front, left rear, right front, right rear.

	What was taught	How it was taught	Materials
		4. Ask S again "What does this say?" 5. If correct praise him, but if incorrect repeat "This says ____". Say it with me. You say it. Praise. 6. Repeat all 4 requests until S answers on 4 correctly, 3 days in a row. 7. Reinforcement: 1¢ per 1 correct response.	
Step 4	Position of: left front left rear right front right rear	1. Ask S "Which is the left front (left rear, right front, right rear) burner?" 2. If correct, praise him and score +. 3. If incorrect MODEL the correct response. Say "No, this is the left front (left rear, right front, right rear) burner". "Say it" and point. 4. Ask S again "Which is the ____ burner?" 5. If correct praise him. If incorrect, prime the correct response by taking his hand and touching the correct burner, and saying "This is the ____ burner. You say it." Reinforce saying it. 6. Repeat all 4 requests until S answers all 4 correctly, 3 days in a row. 7. Reinforcement: 1¢ per 1 correct response.	4 burners on stove.
Step 5	Vocabulary of: off warm Lo 3 2 Hi	1. Point to the button on the stove panel (covering up distractors) and say to S "What does this say?" 2. If correct, praise S and score +. 3. If incorrect MODEL the correct response by saying "No, this says ____. You say it." 4. Ask S again "What does this say?" 5. If correct praise S. If incorrect repeat "This says ____. Say it with me. You say it." Praise for saying it. 6. Repeat all 6 requests until S answers all 6 correctly 3 days in a row. 7. Reinforcement: 1¢ per 1 correct response.	Buttons on stove panel marked: off warm Lo 3 2 Hi

	What was taught	How it was taught	Materials
Step 6	Position of: off warm Lo 3 2 Hi	1. Tell S "Turn the burner to off (warm, Lo, 3, 2, Hi)." 2. If correct, praise S and score +. 3. If incorrect MODEL the correct response. Say "No, this is ____." 4. Tell S again "Turn the burner to ____." 5. If correct praise him. If incorrect PRIME the correct response by taking his finger and pushing the correct button and saying "This is ____. You say it." Reinforce saying it. 6. Repeat all 6 requests until S answers all 6 correctly 3 days in a row. 7. Reinforcement: 1¢ per 1 correct response.	Buttons on stove panel marked: off warm Lo 3 2 Hi
Step 7	Position: turning specific burners to off warm Lo 3 2 Hi (there are 24 combinations)	1. Place a kettle on one of the 4 burners and tell S: "Turn the burner to off (warm, Lo, 3, 2, Hi)." (each time rotate the burner, and change the temperature, so that each burner must be turned to all 6 positions) 2. If correct, praise S and score +. 3. If incorrect MODEL correct response. Say "No, this is the ____ burner - this is ____." 4. Tell S again "Turn the burner to ____." 5. If correct praise S. If incorrect PRIME the correct response by taking his finger and turning burner to ____. Say "Now you turn the burner to ____." Reinforce. 6. Repeat all 24 requests until S answers all 24 correctly, 3 days in a row. 7. Reinforcement: 1¢ per 1 correct response.	Burners, kettle, and panel of buttons on electric stove.
Step 8	Vocabulary: Reading sentences on cards and carrying out the request. "Turn the burner to ____." off warm Lo 3	1. Place a kettle on one of the burners and then hold up a card for S and say "What does this card say?" 2. If correct, praise S and score +. (both reading and carrying out request must be correct) 3. If incorrect, MODEL correct response by saying "No, this card says, 'Turn the burner to ____'. You say it." (Let S do request) Praise.	24 cards with requests printed on them. Kettle, burners, and panel of buttons on electric stove.

What was taught	How it was taught	Materials
2 Hi (for all 24 combinations)	4. Hold card up again "What does this card say?" 5. If correct praise S. If incorrect say "This card says: turn the burner to ____. Say it with me. You say it." Praise. 6. Repeat all 24 cards until S reads all 24 correctly and carries out request for 3 days in a row. 7. Reinforcement: 1¢ per 1 correct response.	

DATA SHEETS - Steps 1 & 2

Date ____________________

Position __________

Reading __________

Name	Left	Right	Front	Rear	Total

DATA SHEET - Steps 3 & 4

Date ____________________

Reading ____________

Position ____________

Name	Left Front	Left Rear	Right Front	Right Rear	Total

DATA SHEET - Steps 5 & 6

Date ____________________

Reading ____________

Position ____________

Name	Off	Warm	Lo	3	2	Hi	Total

DATA SHEET - Steps 7 & 8

.Date ____________________

Name ____________

	Off	Warm	Lo	3	2	Hi	Total
Left Front							
Left Rear							
Right Front							
Right Rear							

STOVE PROJECT

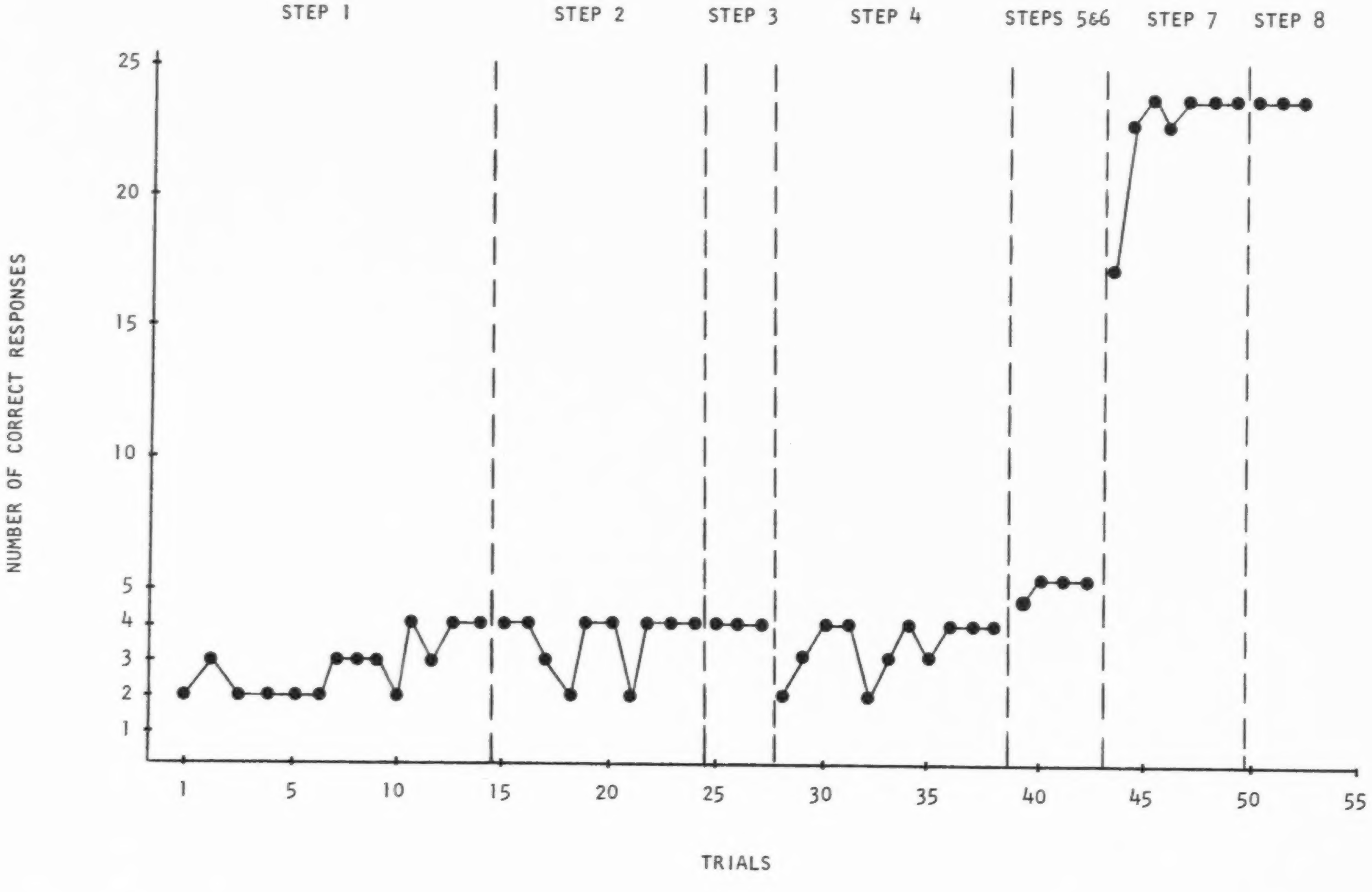
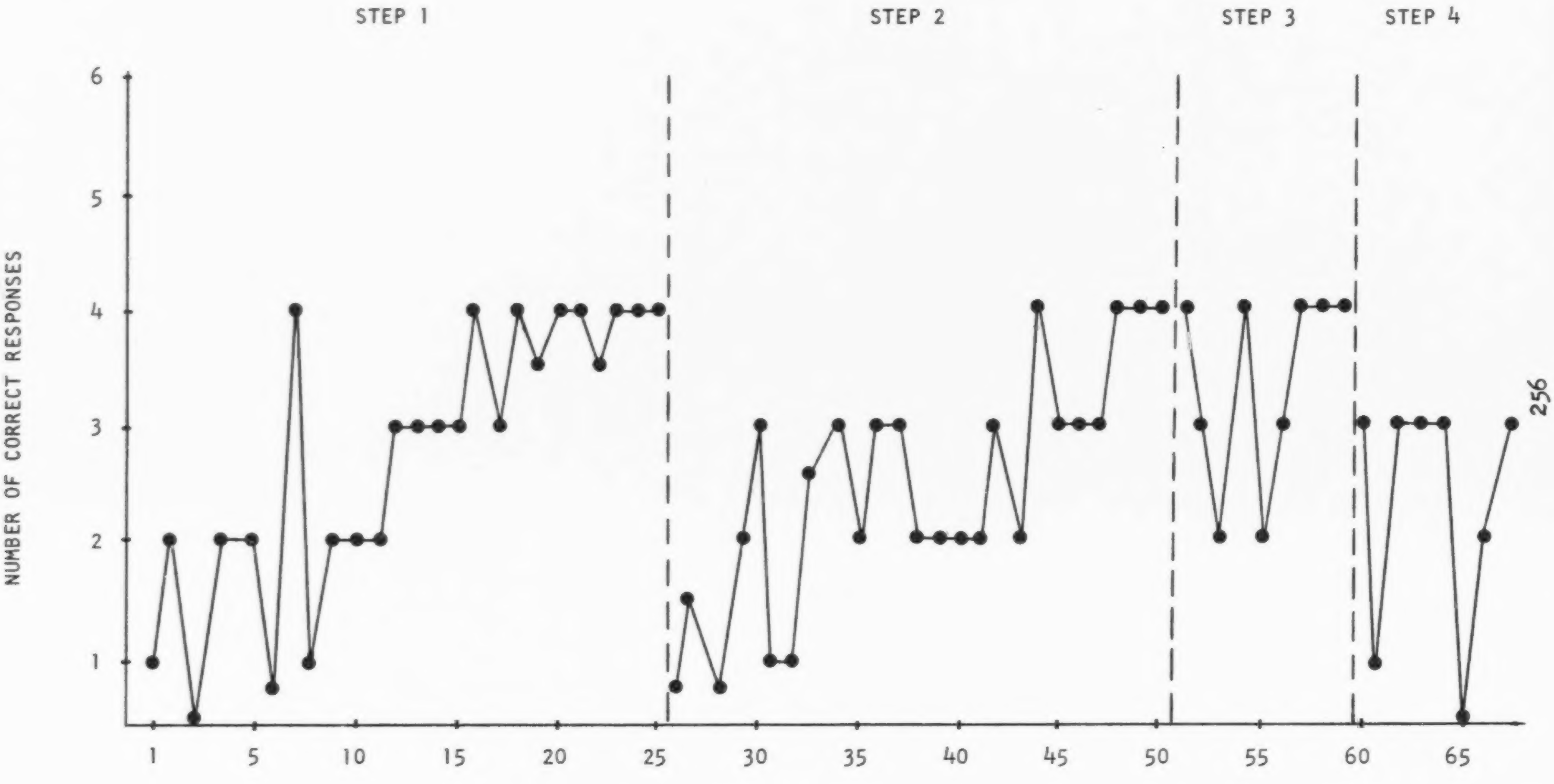


FIGURE 1

STOVE PROJECT



TRIALS

FIGURE 11

Teaching Trainable Level Retarded Students To Use A Clothing Iron

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It is quite probable that in the next few years, through the combined efforts of the textile industry and the womens liberation movement, ironing clothing, etc., will become a dated chauvinistic activity. On the other hand, there will probably always be those who insist upon part of their clothing paraphernalia being hand-ironed either commercially or domestically and there will probably always be those who for some reason will never learn how to use the permanent press cycles of their washing and drying machines.

Thus, it would appear that the ability to iron clothing effectively and efficiently might remain a functional skill in the repertoire of most home-makers. (It should be noted that the term home-makers, as it is used here, refers to both males and females).

The ironing programs described here were concerned with teaching 3 trainable level females (2 trainable level sexists preferred to work in a workshop) to iron handkerchiefs and pillow cases. While other ironing skills have been taught to students in the Badger program, these programs were selected because they present reasonable examples of how a teacher might apply principles of behavioristic task analysis in an attempt to develop ironing skills to the degree that the students will be able to meet the ironing needs of a community living arrangement.

The following information includes how the task was divided arbitrarily into components and arranged in a series, the procedures used to teach the students to perform the components of the series, the data sheets used to record student progress, and a graph illustrating the results of the programs on several of the students involved in the programs.

As can be discerned from Figure I, Ss 1, 2, & 3 performed 6, 4, and 2 correct responses respectively during the baseline trial (trial 1). It can also be discerned from Figure I that Ss 1, 2, & 3 learned to iron handkerchiefs in the manner prescribed in 17, 13, and 10 training trials.

As can be discerned from Figure II, Ss 1 and 2 performed 7 and 7 correct responses respectively in the baseline trial related to ironing pillow cases. It can be discerned also that only 6 teaching trials were required to teach S_1 to iron pillow cases effectively. S_2, while she was on her way toward reaching criterion on the task, was unable to continue in the program due to illness.

Finally, it should be emphasized that the procedures used in the ironing programs here were quite arbitrary and are designed to serve as examples rather than recipes. Obviously, each teacher has the responsibility of designing programs that best fit the response patterns of her students.

Ironing Handkerchief

Task #	Task	Type of Error: (order error or performance error)	Procedures after error occurs and is recorded
1	Put up ironing board.	Order: (S begins another task before board is set up) Performance: (board is set up incorrectly)	A. Non-Punitive Indication of Error: T says: "Try another way", "Try something else", "What do you do now?". B. Verbal Direction: "Put the legs of the board on the floor", etc. C. Model: T performs task, indicates finished situation, takes board down and says to S, "Now you do it" (do not repeat verbal direction here). D. Prime: T guides S through task, then tells and motions to S, "Now you do it."
2	Put iron on board.	Order: (S begins another task before iron is on board) Performance: (S puts iron on table)	A. Non-Punitive Indication of Error: T says: "Try another way", "Try something else", "What do you do now?". B. Verbal Direction: "Put the iron on the ironing board." C. Model: T performs task, indicates finished situation, removes iron and says to S, "Now you do it." D. Prime: T guides S through task, then motions and tells S, "Now you do it."
3	Stand iron in upright position.	Order: (S begins another task before iron is in upright position) Performance: (iron is set flat)	A. Non-Punitive Indication of Error: "Try another way" "Try something else" "What do you do now?" B. Verbal Direction: "Stand the iron up" etc. C. Model: T performs task, indicates finished situation, sets iron down, and says to S, "Now you do it." D. Prime: T guides S through task, then tells and motions to S, "Now you do it."
4	Put in water.	Order: (S begins another task before water is put in) Performance: (water is not put in proper hole)	A. Non-Punitive Indication of Error: "Try another way" "Try something else" "What do you do now?" B. Verbal Direction: "Put the water in the iron". C. Model: T performs task, indicates finished situation, takes water out, and says to S, "Now you do it." D. Prime: T guides S through task, then tells and motions to S, "Now you do it."

Task #	Task	Type of Error: (order error or performance error)	Procedures after error occurs and is recorded
5	Plug iron in wall socket.	Order: (S begins another task before plug is in) Performance: (S cannot get plug in socket or does not know where to put plug)	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
6	Turn iron to medium heat.	Order: (S begins another task before iron is set to medium) Performance: (iron is turned to hot)	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
7	Turn iron to steam position.	Order: (S begins another task before iron is turned to steam) Performance: (iron is turned to dry)	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
8	Place handkerchief on board.	Order: (S begins another task before placing handkerchief on board) Performance: (Puts it on table, etc.)	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
9	Flaten handkerchief out.	Order: (S begins another task before handkerchief is flatened out. Performance: (S leaves wrinkles in flattening handkerchief)	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
10	Iron fabric.	Order: (S begins another task before ironing fabric) Performance: (S irons but leaves wrinkles)	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
11	Fold fabric in half.	Order: (S begins another task before folding) Performance: (S does not match corners when folding in half)	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
12	Iron.	Order: (S begins another task before ironing) Performance: (S leaves wrinkles when ironing)	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
13	Fold handkerchief in half.	Order: Performance: Same as #11.	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime

Task #	Task	Type of Error: (order error or performance error)	Procedures after error occurs and is recorded
14	Iron.	Order: Performance: Same as #12.	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
15	Return iron to upright position and turn off.	Order: (S begins another task before iron is upright and turned off) Performance: (both are not completed or iron is not completely off)	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
16	Place handkerchief on table.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
17	Pull plug out of wall socket.	Order: Performance: (S cannot pull plug out of socket)	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
18	Take iron off board, place on non-burnable counter top in upright position.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
19	Take ironing board down.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime

DATA SHEET

Ironing Handkerchief

1. Put up ironing board.							
2. Put iron on board.							
3. Stand iron in upright position.							
4. Put in water.							
5. Plug iron in wall socket.							
6. Turn iron to medium heat.							
7. Turn iron to steam position.							
8. Place handkerchief on board.							
9. Flaten out.							
10. Iron fabric.							
11. Fold fabric in half.							
12. Iron.							
13. Fold handkerchief in half.							
14. Iron.							
15. Return iron to upright position, and turn iron off.							
16. Place handkerchief on table.							
17. Pull plug out of wall socket.							
18. Take iron off ironing board, place on non-burnable counter top in upright position.							
19. Take ironing board down.							

IRONING HANDKERCHIEF

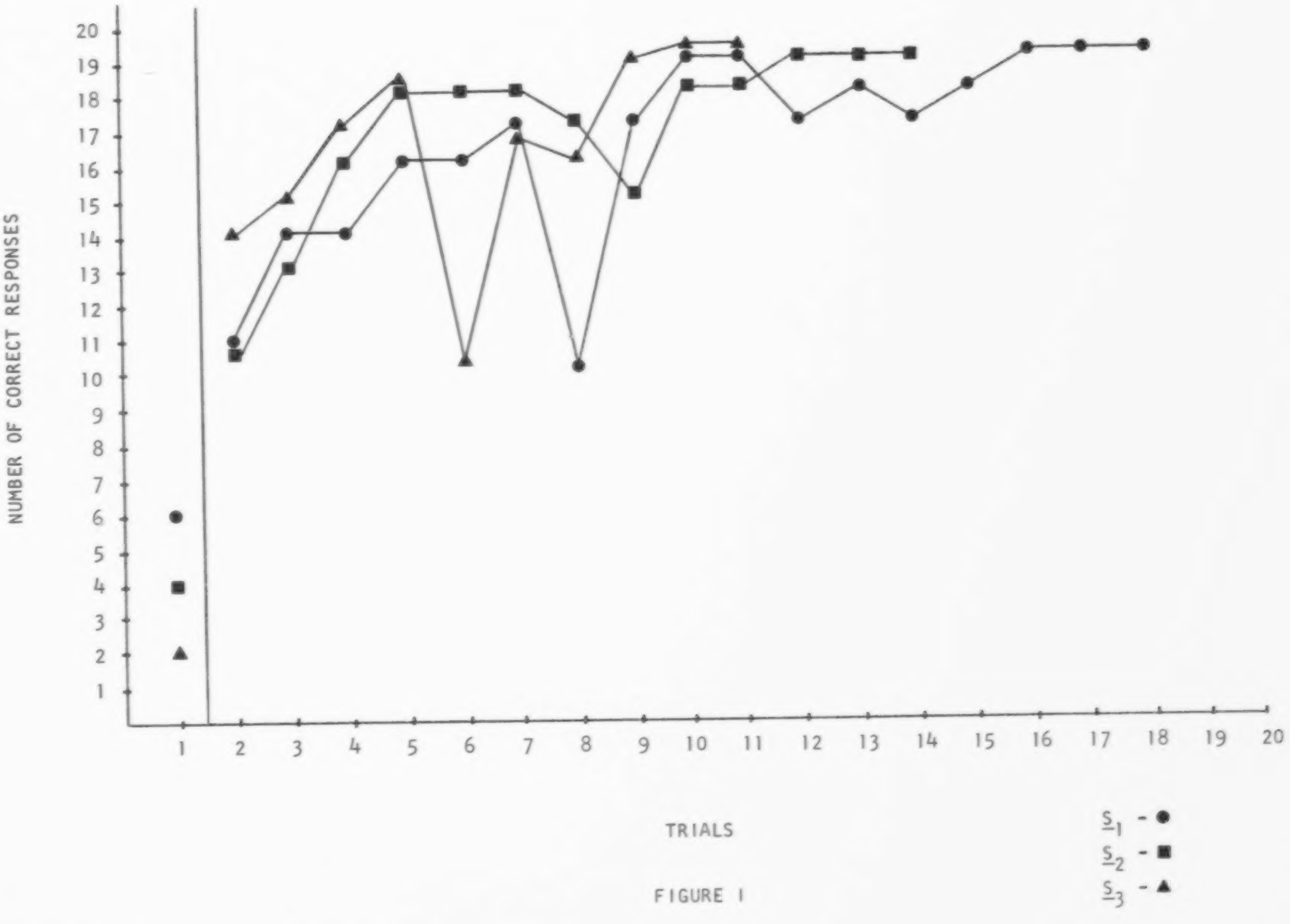


FIGURE I

Ironing Pillow Case

Task #	Task	Type of Error: (order error or performance error)	Procedures after error occurs and is recorded
1	Put up ironing board.	Order: Performance: (same as ironing handkerchief)	A. Non-Punitive Indication of E B. Verbal Direction C. Model D. Prime (same as handkerchief)
2	Put iron on board.	Order: Performance:	A. Non-Punitive Indication of E B. Verbal Direction C. Model D. Prime
3	Stand iron in upright position.	Order: Performance:	A. Non-Punitive Indication of E B. Verbal Direction C. Model D. Prime
4	Put in water.	Order: Performance:	A. Non-Punitive Indication of E B. Verbal Direction C. Model D. Prime
5	Plug iron in wall socket.	Order: Performance:	A. Non-Punitive Indication of E B. Verbal Direction C. Model D. Prime
6	Turn iron to medium heat.	Order: Performance:	A. Non-Punitive Indication of E B. Verbal Direction C. Model D. Prime
7	Turn iron to steam position.	Order: Performance:	A. Non-Punitive Indication of E B. Verbal Direction C. Model D. Prime
8	Place pillow case on board with seamed top of case on board to iron first.	Order: Performance:	A. Non-Punitive Indication of E B. Verbal Direction C. Model D. Prime
9	Iron, making sure seams are flat.	Order: Performance:	A. Non-Punitive Indication of E B. Verbal Direction C. Model D. Prime
10	Bring unironed fabric over board.	Order: Performance:	A. Non-Punitive Indication of E B. Verbal Direction C. Model D. Prime

Task #	Task	Type of Error: (order error or performance error)	Procedures after error occurs and is recorded
11	Iron until smooth.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
12	Bring unironed fabric over board.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
13	Iron until smooth.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
14	Bring unironed fabric over board.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
15	Iron until smooth.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
16	Bring unironed fabric over board.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
17	Iron until smooth.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
18	Turn case over.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
19	Place pillow case on board with seamed top of case on board to iron first.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
20	Iron, making sure seams are flat.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime

Task #	Task	Type of Error: (order error or performance error)	Procedures after error occurs and is recorded
21	Bring unironed fabric over board.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
22	Iron until smooth.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
23	Bring unironed fabric over board.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
24	Iron until smooth.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
25	Bring unironed fabric over board.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
26	Iron until smooth.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
27	Bring unironed fabric over board.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
28	Iron until smooth.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
29	Fold case in half-lengthwise.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
30	Iron.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
31	Fold case in half-lengthwise again.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime

Task #	Task	Type of Error: (order error or performance error)	Procedures after error occurs and is recorded
32	Iron.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
33	Fold end to center.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
34	Fold other end to center.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
35	Iron.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
36	Return iron to upright position and turn off.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
37	Place ironed case on table.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
38	Pull slug out of wall socket.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
39	Take iron off ironing board, place on non-burnable counter top in upright position.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime
40	Take ironing board down.	Order: Performance:	A. Non-Punitive Indication of Error B. Verbal Direction C. Model D. Prime

DATA SHEET

Ironing Pillow Case

1. Put up ironing board.							
2. Put iron on board.							
3. Stand iron in upright position.							
4. Put in water.							
5. Plug iron in wall socket.							
6. Turn iron to medium heat.							
7. Turn iron to steam position.							
8. Place pillow case on board with seamed top of case on board to iron first.							
9. Iron, making sure seams are flat.							
10. Bring unironed fabric over board.							
11. Iron until smooth.							
12. Bring unironed fabric over board.							
13. Iron until smooth.							
14. Bring unironed fabric over board.							
15. Iron until smooth.							
16. Bring unironed fabric over board.							
17. Iron until smooth.							
18. Turn case over.							
19. Place pillow case on board with seamed top of case on board to iron first.							
20. Iron, making sure seams are flat.							
21. Bring unironed fabric over board.							
22. Iron until smooth.							
23. Bring unironed fabric over board.							
24. Iron until smooth.							
25. Bring unironed fabric over board.							

Ironing Pillow Case (Cont.)

26. Iron until smooth.							
27. Bring unironed fabric over board.							
28. Iron until smooth.							
29. Fold case in half lengthwise.							
30. Iron.							
31. Fold case in half lengthwise.							
32. Iron.							
33. Fold end to center.							
34. Fold other end to center.							
35. Iron.							
36. Return iron to upright position and turn iron off.							
37. Place ironed case on table.							
38. Pull plug out of wall socket.							
39. Take iron off ironing board, place on non-burnable counter top in upright position.							
40. Take ironing board down.							

IRONING PILLOW CASE

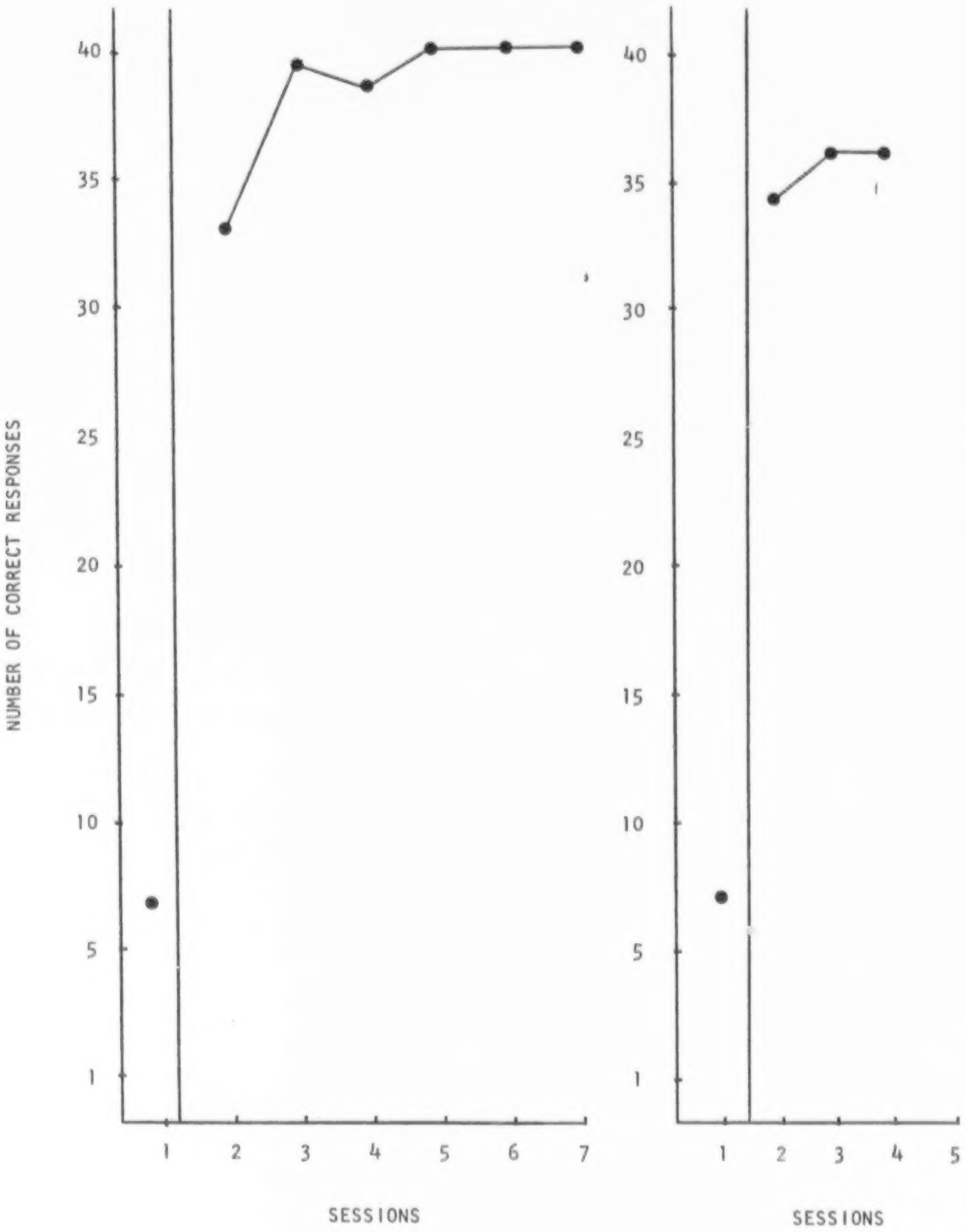


FIGURE 11

Teaching Educable Level Retarded Students To Use A Cooking Oven

Hope Bastian, Pat Johnson and Ed Sontag

Madison Public Schools

An essential behavior for independent living is operating an oven. This behavior also requires the individual to be able to follow the baking instructions included in a recipe or on a packaged food mix. For most individuals the task of operating an oven and following baking instructions is acquired readily with little instruction. Many retarded individuals, however, require more detailed and systematic instruction in operating an oven. This program was designed to facilitate the teaching of "oven operating behaviors" to retarded students. The program was conducted in a public school classroom in keeping with the philosophy that retarded persons must be taught to behave with greater independence.

The program was divided into the following four phases:

Phase I - Baseline measures of the students ability to set an oven timer, set an oven temperature selector, and set the oven regulator to bake were obtained. The baking time and temperature was read by the student and the teacher from flashcards.

Phase II - The students were taught to set the oven timer at the given time.

Phase III - The students were taught to set the oven temperature selector to the given temperature and set the oven regulator to bake.

Phase IV - The students were taught to set the oven timer to the given time, set the oven temperature dial to the given temperature and turn the oven regulator to bake.

This program was supported in part by funds granted to the Madison Public Schools by the State of Wisconsin, Department of Vocational Education and in part by NICHD Grant 5 P01 HD 03352 to the University of Wisconsin Center on Mental Retardation.

METHOD

Students (Ss)

Seven male S's functioning at the educable mentally retarded level ranging in CA from 15 to 19 years and in IQ from 55 to 79 were involved in the program.

Materials and Instructional Arrangement

1) The instructional materials included an electric stove and oven combination.

2) 12, 4" x 6" index cards with the written instructions "Bake ____ minutes" printed on them. The 12 times used were: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60 minutes.

3) 8, 4" x 6" index cards with the following written instructions assigned randomly, "Preheat oven to ____°", "Heat oven to ____°", "Bake at ____°". (These three cues indicating temperature selection were taken from packages distributed by three major food mix companies.) The temperature settings on the cards were: 300°, 325°, 350°, 375°, 400°, 425°, 475°.

4) 12, 4" x 6" index cards with the instructions "Bake at ____° for ____ minutes" printed on them. The temperatures and times appearing together on the cards were as follows: 400° for 25 minutes, 350° for 35 minutes, 325° for 20 minutes, 425° for 10 minutes, 475° for 15 minutes, 400° for 5 minutes, 375° for 30 minutes, 350° for 40 minutes, 300° for 45 minutes, 375° for 50 minutes, 450° for 55 minutes, 350° for 60 minutes.

5) Three data sheets were constructed in order to record each response made by each S in each phase (See Data Sheets I, II, and III).

6) Social praise by the teacher (T) was used as reinforcement for Phases II, III and IV.

7) All instruction took place in a home economics classroom.

TEACHING PROCEDURE

Phase I - A baseline measure of S's ability to set an oven timer at the time indicated and set the temperature selector at the given temperature and turn the oven regulator to "Bake" was obtained.

The T and S stood at the oven. Only one S at a given time was at the oven with T, the other Ss remained at their seats working on an entirely different project with another T. T presented a card to S_1 and read from the card, "Bake at ____° for ____ minutes". After S_1 responded, the response was recorded

(Data Sheet I) as either correct or incorrect by *T* on a data sheet. The second card was then presented to S_1 by *T* while *T* read from the card, "Bake at ____° for ____ minutes." After S_1 responded to the second card, the response was recorded on a data sheet. This procedure continued until S_1 was presented with each of the 12 cards. Then S_1 was returned to his chair with the other *S*s and S_2 was to be presented with each of the 12 cards by the *T* at the oven. This procedure was followed for each of the seven *S*s.

Phase II - Teaching *S*s to set the oven timer.

As in Phase I *S*s stood at the oven with *T* individually while the other *S*s worked at their chairs on another project. Then *T* presented S_1 with a card while reading it, "Bake for ____ minutes". If *S* responded correctly the response was recorded by *T* and *T* immediately praised S_1 with phrases like "good job," "great work". If S_1 responded incorrectly the response was recorded by *T* (Data Sheet II) and *T* immediately modeled the correct response saying "the card says 'Bake for ____ minutes'..now you say it and set the timer." S_1 was then required to read the card again and set the timer to the correct time. If S_1 responded correctly *T* immediately praised him. If S_1 responded incorrectly *T* modeled the correct response again (In some instances it was necessary for *T* to prime the correct response by taking the *S*'s hand and setting the timer). This procedure was followed until S_1 had been presented with all 12 of the cards. Then S_1 was returned to his chair and S_2 came to the oven. *T* presented all of the cards to S_2 in the same manner as described above with S_1. When S_2 was presented with all of the cards, he returned to his chair and S_3 came to the oven etc., until all seven *S*'s had individually been presented with all 12 of the "time" cards. When an *S* responded correctly to all 12 of the cards, 3 times in succession, he was advanced to Phase III.

Phase III - Teaching Ss to set the temperature selector.

As in the preceeding phases the instruction in Phase III was given by *T* individually to each $\underline{S}$. $\underline{T}$ presented $\underline{S}_1$ with the first card requiring $\underline{S}_1$ to select a specific temperature with the cues "Preheat oven to ____°", "Heat oven to ____°", or "Bake at ____°", printed on it. If $\underline{S}_1$ selected the correct temperature and turned the oven regulator to "Bake," $\underline{T}$ recorded the response as correct (Data Sheet III) and immediately praised $\underline{S}_1$. If $\underline{S}_1$ did not respond correctly $\underline{T}$ recorded the response as incorrect and immediately modeled the correct response. $\underline{T}$ continued to model the response for $\underline{S}_1$ until $\underline{S}_1$'s response matched $\underline{T}$'s, then $\underline{T}$ presented the second "temperature" card to $\underline{S}_1$ and followed the same teaching procedure until $\underline{S}_1$ was presented with all 8 of the "temperature" cards. The remaining $\underline{S}$s were individually instructed in the same manner as used with $\underline{S}_1$. When an $\underline{S}$ responded correctly to all 8 of the cards, three trials in succession, he could then advance to Phase IV.

Phase IV - Teaching $\underline{S}$s to set the oven timer and temperature selector and turn the regulator to "Bake".

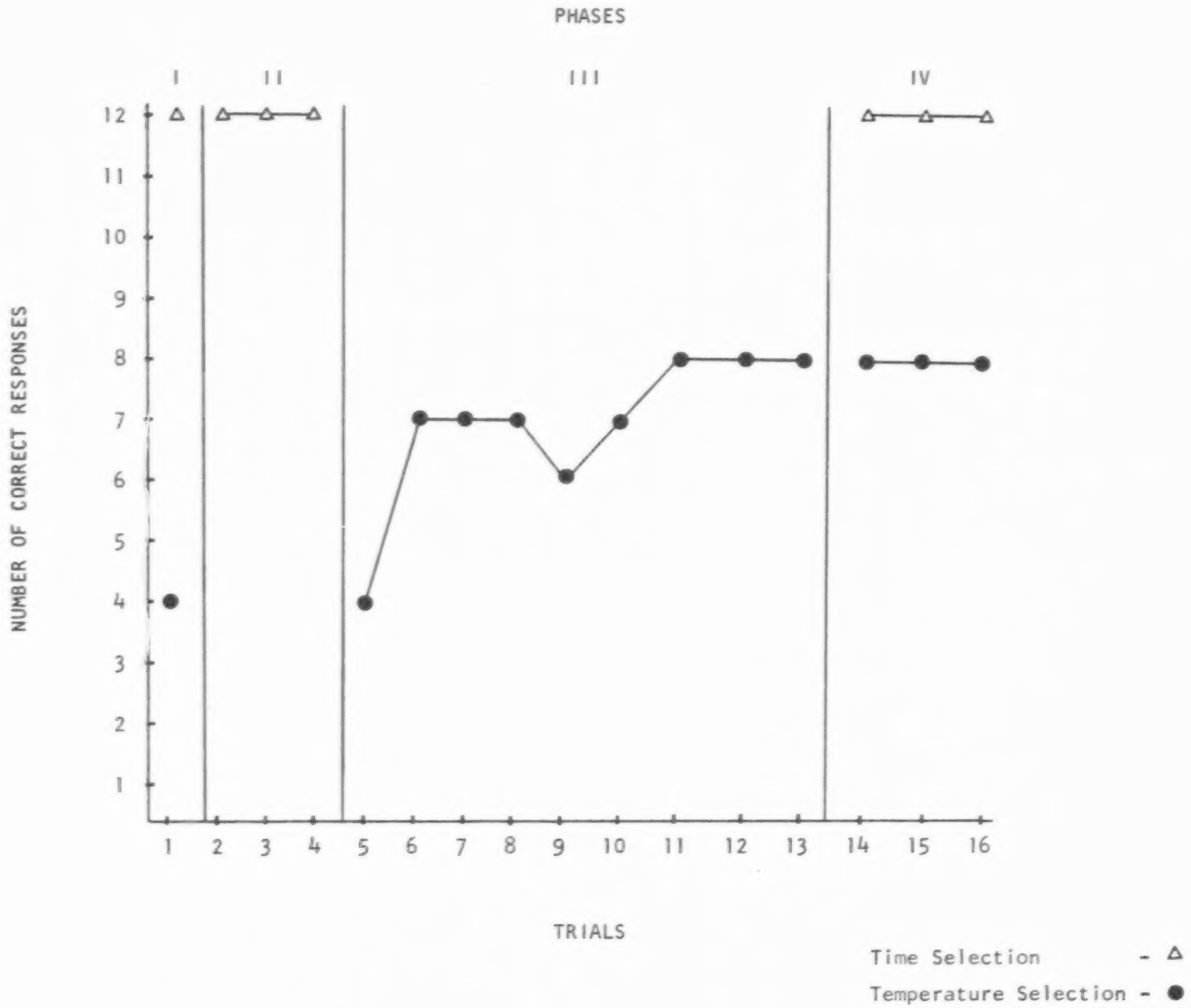
This Phase required $\underline{S}$s to combine the tasks they had learned in Phases II and III. Again the instruction was given individually to each $\underline{S}$. $\underline{T}$ presented $\underline{S}_1$ with the first card reading "Bake at ____° for ____ minutes." If $\underline{S}_1$ responded correctly the response was recorded by $\underline{T}$ (Data Sheet I) and $\underline{T}$ immediately praised $\underline{S}_1$. If $\underline{S}_1$ responded incorrectly $\underline{T}$ recorded the response and also indicated on the data sheet on which task (setting the oven timer or selecting the temperature) the error had been made. $\underline{T}$ then modeled the correct response for $\underline{S}_1$ requiring $\underline{S}_1$ to match $\underline{T}$'s response. When $\underline{S}_1$ matched $\underline{T}$'s response, $\underline{T}$ presented the second card to $\underline{S}_1$. The teaching was done in the same fashion with all 7 $\underline{S}$'s so that each $\underline{S}$ was presented with all 12 of the "Bake at ____° for ____ minutes" cards on an individual basis. An $\underline{S}$ completed the oven operating program when he responded correctly to all 12 of the cards ("Bake at ____° for ____ minutes") for three consecutive trials.

RESULTS

The progress of one of the seven Ss is shown in Figure I. The graph conveys that during Phase I (baseline) S was able to set the oven timer correctly. However, S was unable to select the correct temperature. Phase II (teaching to select baking time) demonstrates as in the baseline period, that the S could correctly select the appropriate baking time prior to instruction. Phase III (teaching temperature selection) was the task in which S was not successful prior to instruction. S missed 4 out of 8 responses in baseline; however, in 9 trials (Trials 5-13) S reached criterion (all 8 temperature selections correct in 3 successive trials). In Phase IV (teaching to set timer and select temperature) S was able to successfully complete the task in three trials (Trials 14, 15, 16).

The seven Ss, functioning at the EMR level, in this program, performed at a relatively high level during the baseline period indicating that they already had within their behavioral repertoires, the necessary skills to operate an electric oven. These Ss served as models in order for the T to assess her analysis of the tasks involved for instruction in the future. Six of the seven Ss completed the program. In view of the program results, one can assume that the task of operating an oven has been systematically programmed and can be presented to students functioning at a lower level than the Ss in this demonstration.

FIGURE I


PHASES
I
II
III
IV
NUMBER OF CORRECT RESPONSES
1
2
3
4
5
6
7
8
9
10
11
12
TRIALS
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Time Selection - △
Temperature Selection - ●

DATA SHEET I

Name ____________________________

Bake at ... for ... minutes

Date	$\frac{400}{25}$	$\frac{350}{35}$	$\frac{325}{20}$	$\frac{425}{10}$	$\frac{475}{15}$	$\frac{400}{5}$	$\frac{375}{30}$	$\frac{350}{40}$	$\frac{300}{45}$	$\frac{375}{50}$	$\frac{450}{55}$	$\frac{350}{60}$	TOTALS	

DATA SHEET II

Name ______________________________

Bake for ... Minutes

Date	5	10	15	20	25	30	35	40	45	50	55	60	TOTAL

Preheat oven to ...
Heat oven to ...
Bake at ...

DATA SHEET III

Name ____________________

	Degrees								
Date	300°	325°	350°	375°	400°	425°	450°	475°	TOTALS

Teaching Trainable Level Students to Prepare Instant Hot Cereal

Hope Bastian

Madison Public Schools

Mornings in the common household can be very hectic if mother must fix different breakfasts for each child to accommodate his individual taste. To simplify matters, many mothers require their children to make their own breakfast. Most children acquire the skills necessary to prepare simple breakfasts incidentally. For a trainable retarded child, however, the specific task must be taught directly.

The following is a sample of a systematic task analysis of making hot instant breakfast cereals.

To initiate the activity the students were simply told to, "Make your breakfast. Let's have hot cereal today. All the things you need are in the cupboard and refrigerator." Subsequently, each student was evaluated as to whether or not he could prepare the hot cereal correctly (See Data Sheet I).

After it was established that the students could not prepare the hot cereal correctly (baseline) the teaching procedures described in detail below were implemented.

While the teaching procedures were in effect the following incentive conditions were arranged.

A) When a student completed a step in the program successfully he was given social praise and a point.

B) At the end of a particular day the points were totaled. On the first day 8 points had to be earned in order for the students to be allowed to eat the cereal.

This program was supported in part by funds granted to the Madison Public Schools by the State of Wisconsin, Department of Vocational Education and in part by NICHD Grant 5 POI HD 03352 to the University of Wisconsin Center on Mental Retardation.

C) As the students progressed through the program the number of points earned before they were allowed to eat the cereal was increased (e.g., on day five, 14 points were required).

D) A frequency polygon was constructed for each student and placed upon the classroom wall. At the end of each trial the total number of correct responses a student made was recorded. If his performance improved his "line" went up and he was given various social acknowledgements.

A total of 21 students ranging in age from 12-21 and diagnosed as trainable level mentally retarded were involved in the program. By the end of the program all 21 of the students had performed all the steps of the task correctly and in sequence at least once. Thus, they demonstrated that they were capable of acquiring the skills necessary to prepare a nutritious breakfast.

However, toward the end of the program, it seemed that performance problems accrued. That is, for some strange reason, it appeared that the students did not seem to remain excited about the wonderful experience of eating oatmeal. Thus, the teacher proceeded to cream-o-wheat.

Attached are two graphs (Figures I & II) depicting the performance of two of the 21 students. As most of the acquisition curves are similar to those presented, the presentation of more graphs would appear redundant.

TEACHING PROCEDURE

Task #	Task	Type of Error: (order error or performance error)	Procedures after error occurs and is recorded
1	Get out box of cereal.	Order: (S begins another task) Performance: (S gets out something other than instant cereal box)	A. Non-Punitive Indication of Error: "Try something else." "What do you do now?" B. Verbal Direction: "Get out the box of cereal." C. Model: T performs task, returns cereal box to cupboard, and then says, "Now you do it." D. Prime: T guides S through tasks, then tells S, "Now you do it."
2	Get out bowl, spoon, and napkin.	Order: (S begins another task) Performance: (S does not get the three items out of the cupboard)	A. Non-Punitive Indication of Error: "Try something else." "Get some more things." B. Verbal Direction: "Get out a bowl, spoon, and napkin." C. Model: T performs task and says, "Now you do it." D. Prime: T guides S through task and then tells S, "Now you do it."
3	Get out sugar and milk.	Order: (S begins another task) Performance: (S does not get out both sugar and milk)	A. Non-Punitive Indication of Error: "Try something else." "What do you do next?" B. Verbal Direction: "Get out sugar and milk." C. Model: T performs task and says, "Now you do it." D. Prime: T guides S through task and then tells S, "Now you do it."
4	Open cereal box.	Order: (S begins another task) Performance: (S tears box open)	A. Non-Punitive Indication of Error: "Try another way." "What do you do next?" B. Verbal Direction: "Open the cereal box." C. Model: T performs task and says, "Now you do it." D. Prime: T guides S through tasks and then tells S, "Now you do it."
5	Take out packet of cereal.	Order: (S begins another task) Performance: (S takes out more than one packet of cereal)	A. Non-Punitive Indication of Error: "Try something different." B. Verbal Direction: "Take one packet of cereal out of the box." C. Model: T performs task and says, "Now you do it." D. Prime: T guides S through task and then tells S, "Now you do it."

Task #	Task	Type of Error: (order error or performance error)	Procedures after error occurs and is recorded
6	Open cereal packet without spilling contents.	Order: (S begins another task) Performance: (S spills cereal when opening cereal packet)	A. Order Error: a. Non-Punitive Indication of Error "Try something else." b. Verbal Direction: "Open the cereal packet without spilling contents." B. Performance Error: Child is merely told to be more careful the next time.
7	Pour cereal into bowl without spilling.	Order: (S begins another task) Performance: (S spills cereal)	A. Order Error: a. Non-Punitive Indication of Error "Try something different." b. Verbal Direction: "Pour the cereal into your bowl without spilling." B. Performance Error: Child is merely told to be more careful.
8	Turn hot water faucet on.	Order: (S begins another task) Performance: (S turns cold water faucet on)	A. Non-Punitive Indication of Error: "Try something different." B. Verbal Direction: "Turn the hot water faucet on." C. Model: T performs the task and says, "Now you do it." D. Prime: T guides S through task and then tells S, "Now you do it."
9	Find $\frac{1}{2}$ measuring cup.	Order: (S begins another task) Performance: (S finds measuring cup other than $\frac{1}{2}$)	A. Non-Punitive Indication of Error: "Try a different cup." B. Verbal Direction: "Find the measuring cup with $\frac{1}{2}$ printed on it." C. Model: T performs task and shows S $\frac{1}{2}$ cup and then says, "Now you find the correct measuring cup." D. Prime: T guides S to correct cup and then tells S, "Now you find the correct measuring cup."
10	Fill $\frac{1}{2}$ cup with water.	Order: (S begins another task) Performance: (S does not fill $\frac{1}{2}$ cup)	A. Non-Punitive Indication of Error: "Try it again." B. Verbal Direction: "Fill the cup up to the top." C. Model: T performs task and then says, "Now you fill the measuring cup." D. Prime: T guides S to correct cup and tells S, "Now you fill the measuring cup."

Task #	Task	Type of Error: (order error or performance error)	Procedures after error occurs and is recorded
11	Turn off hot water faucet.	Order: (S begins another task) Performance: (S does not turn hot water faucet off tightly)	A. Non-Punitive Indication of Error: "Did you forget something?" B. Verbal Direction: "Turn the hot water faucet off." C. Model: T performs task and then says, "Now you do it." D. Prime: T guides S through task and then says, "Now you do it."
12	Pour hot water into bowl without spilling.	Order: (S begins another task) Performance: (S spills water on table)	A. Order Error: a. Non-Punitive Indication of Error "Try something else." b. Verbal Direction: "Pour hot water into bowl without spilling." B. Performance Error: Child is merely told to be more careful the next time.
13	Stir cereal with spoon until it is	Order: (S begins another task) Performance: (S does not stir cereal until it is smooth)	A. Non-Punitive Indication of Error: "Should you do something else?" B. Verbal Direction: "Stir your cereal more." "Stir until it is smooth." C. Prime: Guide S through task and says, "O.K. it is smooth now."
14	Put 1 teaspoon sugar in bowl.	Order: (S begins another task) Performance: (S puts more or less than 1 teaspoon in bowl)	A. Non-Punitive Indication of Error: "Did you forget something?" B. Verbal Direction: "Put 1 teaspoon sugar in bowl." C. Prime: T guides S through task.
15	Pour milk in bowl without spilling.	Order: (S begins another task) Performance: (S spills milk)	A. Order Error: a. Non-Punitive Indication of Error "Did you forget something?" b. Verbal Direction: "Pour milk into your bowl." B. Performance Error: Child is merely told to be more careful.
16	Stir cereal with spoon.	Order: (S begins another task)	A. Non-Punitive Indication of Error: "Did you forget something?" B. Verbal Direction: "Stir your cereal with the spoon."
17	Put napkin on lap.	Order: (S begins another task) Performance: (S does not open napkin when putting napkin on his lap)	A. Order Error: a. Non-Punitive Indication of Error "Did you forget something?" b. Verbal Direction: "Put your napkin on your lap."

Task #	Task	Type of Error: (order error or performance error)	Procedures after error occurs and is recorded
			B. Performance Error: a. Non-Punitive Indication of Error "Try another way." b. Verbal Direction: "Open your napkin and put it on your lap." c. Model: T performs task and then says, "Now you do it." d. Prime: T guides S through task and then says, "Now you do it."
18	Eat without spilling cereal.	Order: (S begins another task) Performance: (S spills cereal)	A. Order Error: a. Non-Punitive Indication of Error "Now what order can we do?" b. Verbal Direction: "Eat your cereal without spilling." B. Performance Error: S is merely told to eat without spilling or to put his bowl closer to him.
19	Rinse cereal bowl with water.	Order: (S begins another task) Performance: (S does not rinse bowl clean)	A. Non-Punitive Indication of Error: "What should we do next?" "Did you forget something?" B. Verbal Direction: "Rinse your cereal bowl with water." C. Model: T performs task and then says, "Now you do it." D. Prime: T guides S through task and then says, "Now you do it."

DATA SHEET I

INSTANT CEREAL

Name ____________________

Date										
1. Get out box of cereal.										
2. Get out bowl, spoon, napkin.										
3. Get out sugar, milk.										
4. Open cereal box.										
5. Take out packet of cereal.										
6. Open cereal packet without spilling contents.										
7. Pour cereal into bowl without spilling contents.										
8. Turn hot water faucet on.										
9. Find $\frac{1}{2}$ cup.										
10. Fill $\frac{1}{2}$ cup with water.										
11. Turn off hot water faucet.										
12. Pour hot water into bowl without spilling.										
13. Stir cereal with spoon until it is thoroughly mixed.										
14. Put 1 teaspoon sugar in bowl.										
15. Pour milk in bowl.										
16. Stir cereal with spoon.										
17. Put napkin on lap.										
18. Eat without spilling cereal.										
19. Rinse cereal bowl with water.										
TOTAL										

FIGURE I

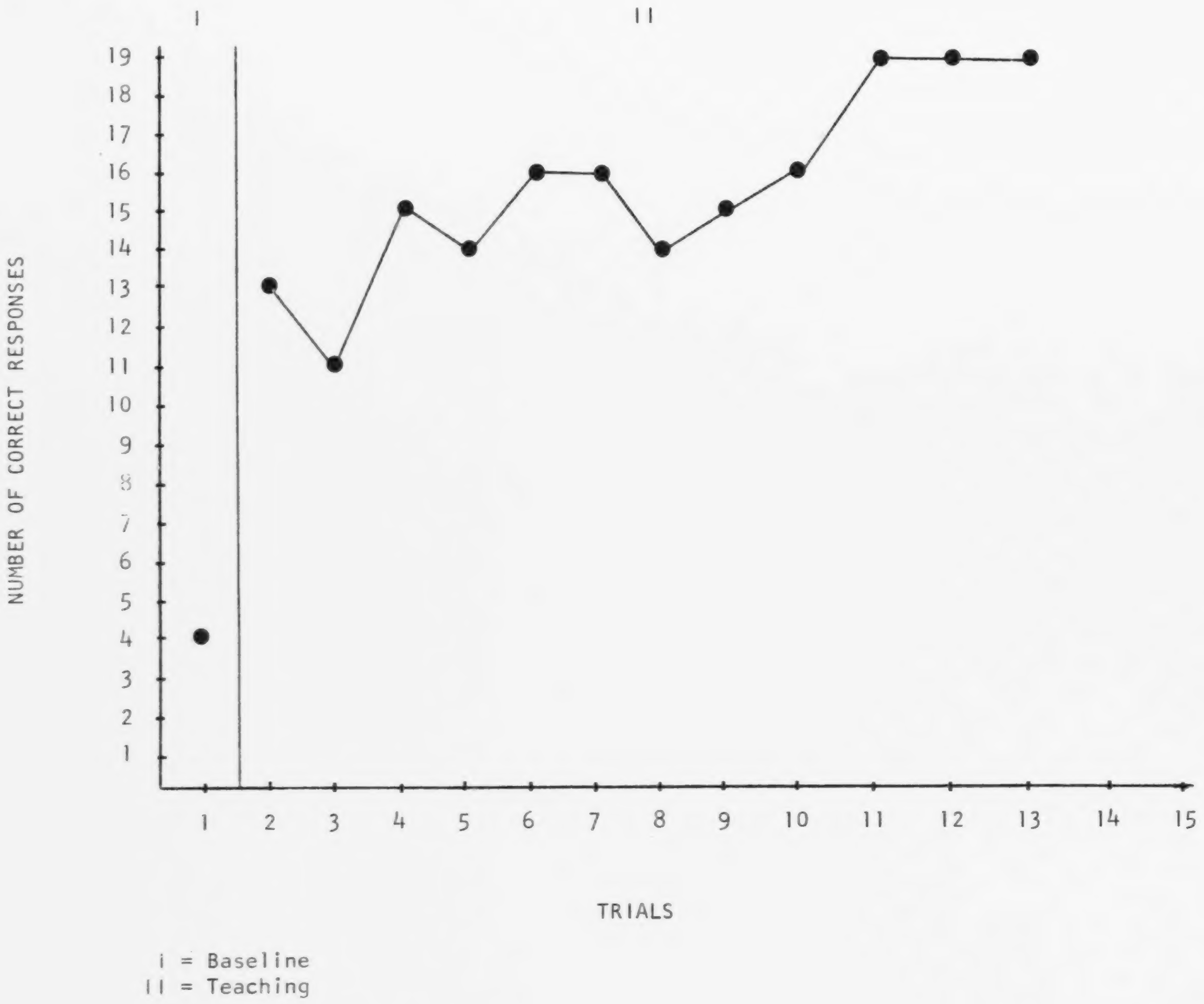
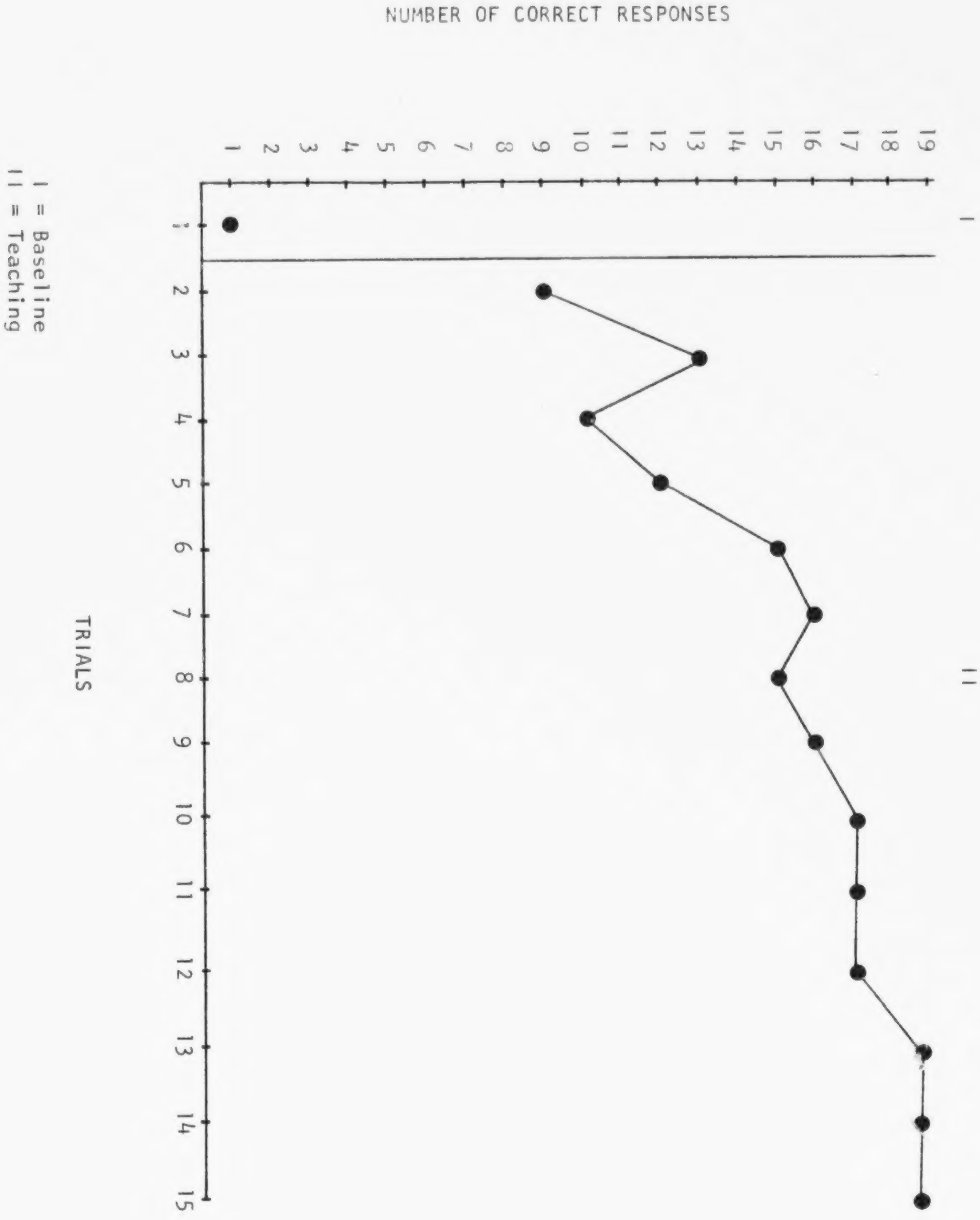

I
II
NUMBER OF CORRECT RESPONSES
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
TRIALS
i = Baseline
II = Teaching

FIGURE 11


NUMBER OF CORRECT RESPONSES
19
18
17
16
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10
9
8
7
6
5
4
3
2
1
I
II
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
TRIALS
I = Baseline
II = Teaching

Teaching Trainable Level Retarded Students to Functionally Read a Basic Grocery List

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Securing and preparing food is one of the most basic prerequisites of independent living. Historically, trainable level students have not acquired the skills necessary to secure and prepare their own food, but have been dependent upon others to do so for them. This program is one component of a prevocational training project designed to foster as many independent living skills as possible in adolescent trainable level retarded students. An obvious prerequisite of preparing food is the ability to emit the responses necessary to secure the food in a community environment.

The specific purpose of this program was to teach the students to functionally read the labels of 50 basic foods in the anticipation that reading food labels is a basic requirement of securing food in our culture. Functional reading, as the phrase is used here, refers to verbally labeling a printed stimulus and subsequently indicating behaviorally that the meaning of the stimulus labeled is understood. Perhaps under ideal learning conditions the students of concern could be taught to devise grocery lists and secure the required foods in their homes and community food stores. However, it is extremely difficult for a public school program with the inherent ratio, financial, temporal and mobility constraints. Thus, many of the tasks required to secure food were simulated in a public school classroom.

The entire program was divided into the following phases:

This program was supported in part by funds granted to the Madison Public Schools by the State of Wisconsin, Department of Vocational Education and in part by NICHD Grant 5 P01 HD 03352 to the University of Wisconsin Center on Mental Retardation.

Phase I - Baseline A - Each student's ability to label 50 food words was measured.

Baseline B - Each student's ability to touch the correct food items in response to verbal cues provided by the teacher was measured.

Phase II - A. The students were taught to verbally label a list of 10 food words.

B. The students were taught to touch the food items corresponding to the words on the list.

Phase III - The students were taught to write the 10 food words on an order blank.

Phase IV - The students were taught to label the printed words and then put the foods corresponding to these words in a standard grocery store paper bag.

Phase V - Phases II-IV were repeated with lists 2, 3, 4, and 5.

METHOD

Students (Ss)

The 10 female Ss involved in the program (2 groups of 5) ranged in CA from 14-21 and in IQ from 40-55. In the past Ss had been accused of manifesting: Down's Syndrome, emotional disturbance, brain injury, and psychosis. Their records also contained such encouraging information as: "will be totally dependent throughout life," "will never read," "apathetic," and "unmotivated".

Materials

A - 50 food items were selected for use in this program.

B - The 50 words corresponding to the food item were divided into the following 5 lists of 10 words each.

List I	List II
peas	fish sticks
corn	crisco
bread	hamburger
french dressing	potatoes
oatmeal	lettuce
milk	oranges
sugar	grapefruit
eggs	orange juice
tuna fish	buns
rice krispie	peanut butter

List III

hot dogs
ketchup
salt
bisquick
green beans
cheese
butter
mayonaise
tomato soup
mustard

List IV

macaroni
bananas
apples
spaghetti
bacon
pickles
ice cream
pizza
pepper
potato chips

List V

coffee
kool-aid
syrup
brown sugar
crackers
powdered sugar
cookies
chocolate
carrots

Teaching Procedures

Phase I Baseline measures of *S*s ability to functionally read Grocery List I were obtained in the following manner.

A - The 50 food items were displayed on a table.

B - One of the 10 words on List I was presented to an *S* and he was asked to label the word.

C - If *S* labeled the word he was asked to touch the food the word represented.

D - If *S* did not correctly label the word, he was also asked to touch the food the word represented. He was, however, not told the verbal label.

E - All responses were recorded on a data sheet (See Data Sheet I).

Phase II Teaching Ss to label the words on List I.

The 5 *S*s were seated around a large table with the 50 food items displayed in front of them. Each *S* was given a 3"x5" printed grocery list (each day the grocery list order is changed to prevent *S*s from learning the words by position).

The first *S* was asked to verbally identify the first word on List I and then identify the item by touching it. Social praise by the group followed if the response was correct.

If *S* did not label the word correctly the teacher (*T*) modeled the correct response and said again, "What does this word say?" When *S* said the correct word *T* then instructed *S* to touch the correct food item. If *S* did not touch the correct food item *T* modeled the correct response and instructed *S* to match the response modeled.

This procedure was followed consecutively with both groups of Ss until each S could both label the words on List I and touch the corresponding food items on three consecutive occasions.

Phase III Writing grocery lists.

After an S learned to label the printed words and could touch the corresponding items, she was given individual writing sheets (See Individual Writing Sheets I & II). Direct measurement of all responses was not obtained in this phase. It was used as a "holding task" for those Ss who had completed Phase II rapidly and who became bored with merely watching other Ss learn to verbally label the words.

Phase IV Grocery shopping

After Ss learned to label the printed words and touch the corresponding food items they were given a 3" x 5" grocery list and told to "Do your own grocery shopping". That is, Ss were required to perform the following operations consecutively.

A - Label aloud the first word on the list.

B - Pick up the food item and put it in a bag.

C - Check off the word on the list with a pencil as they progressed through the list.

If a word on the list was incorrectly labeled, or if Ss picked up the wrong food item, they were corrected immediately. This procedure was followed until each of the 10 Ss could correctly read grocery List I on three consecutive occasions.

When Ss performed correctly on List I the same procedures were used to teach them to read Lists II, III, IV, and V.

RESULTS AND DISCUSSION

The program was successfully completed by 9 of the 10 participating students. The student who was not successful learned the lists to the initial criterion level; however, she could not retain the material she had learned. This was evidenced when the girls had review sessions on "grocery shopping", after they had completed Lists I-III and again after they had completed Lists IV-V. Graphing of Phase II (verbal labeling and touching correct items) was done in the following manner: If the student verbally labeled and touched the correct item, it was graphed as a correct response. If she only touched the correct item, it was not counted as correct and therefore was not graphed as a correct response.

One obvious extension of this simulated program would be to teach the students to prepare a realistic grocery list and then teach them to secure the items on the list in a community grocery store. Such a program is anticipated during the coming school year.

DATA SHEET I

Date	S_1		S_2		S_3		S_4		S_5		Total Correct	
	V	T	V	T	V	T	V	T	V	T	V	T
peas												
corn												
bread												
french dressing												
oatmeal												
milk												
sugar												
eggs												
tuna fish												
rice krispies												
Total												

V = verbal identification

T = touch correct item

INDIVIDUAL WRITING SHEET I

peas

corn

bread

french dressing

oatmeal

milk

sugar

eggs

tuna fish

rice krispies

INDIVIDUAL WRITING SHEET II

peas ______________________
corn ______________________
bread ______________________
french dressing ______________________
oatmeal ______________________
milk ______________________
sugar ______________________
eggs ______________________
tuna fish ______________________
rice krispies ______________________

1 - ______________________
2 - ______________________
3 - ______________________
4 - ______________________
5 - ______________________
6 - ______________________
7 - ______________________
8 - ______________________
9 - ______________________
10 - ______________________

Teaching Trainable Level Retarded Students To Identify Different Types of Bread

Hope Bastian, Pat Johnson and Ed Sontag

Madison Public Schools

Due to the many types of breads that exist, an individual must be able to differentiate between various bread types in order to function adequately in vocational social and domestic situations. For example, when in a restaurant ordering a breakfast, an individual has to indicate he specifically wants toast. If he merely requests "bread," he will be disappointed and perplexed when his breakfast is served to him. If taught to differentiate between bread types a retarded individual may avoid frustrating situations like this.

This bread identification program was designed to teach trainable level retarded persons to differentiate between 7 frequently used bread types. The specific breads used were: white bread, rye bread, biscuit, hot dog bun, hamburger bun, dinner roll, and toast.

The subjects (Ss) participating were 10 females ranging in CA from 12 to 19 years and ranging in IQ from 30 to 55.

The 10 Ss were seated around the same table. The 7 different bread types were randomly arranged on a flat cookie sheet. The cookie sheet and bread were placed on the center of the table, so each type of bread could be viewed by all Ss. Individual baselines were taken of Ss ability to identify the bread types by verbally labeling them as T touched them.

During the teaching phase the teacher (T), pointed at random to a bread type asking S, "What kind of bread is this?" S was required to verbally label it. If S responded correctly, the response was recorded on the data sheet

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This program was supported in part by funds granted to the Madison Public Schools by the State of Wisconsin, Department of Vocational Education and in part by NICHD Grant 5 P01 HD 03352 to the University of Wisconsin Center on Mental Retardation.

(Data Sheet I) and T immediately praised S, with phrases like "nice work", "that's right", "good job", etc. If S incorrectly labeled the bread T recorded the response on the data sheet and immediately corrected S by saying, "No, this is (white bread).. Say white bread. What is it?" S_1, "White bread." T, "Yes, very good." This modeling procedure was continued until S_1 responded correctly to T's question, "What kind of bread is this?" Then T pointed to a different type of bread and asked S_2, "What kind of bread is this?" If S_2 labeled the second type of bread correctly the response was recorded and T immediately praised S_2. If S_2 responded incorrectly T recorded it as an incorrect response and immediately said, "No, this is (a biscuit). Say biscuit. What kind of bread is this?", S_2, "biscuit." T, "good work." This procedure was followed until each of the 10 S's identified each of the seven bread types.

RESULTS

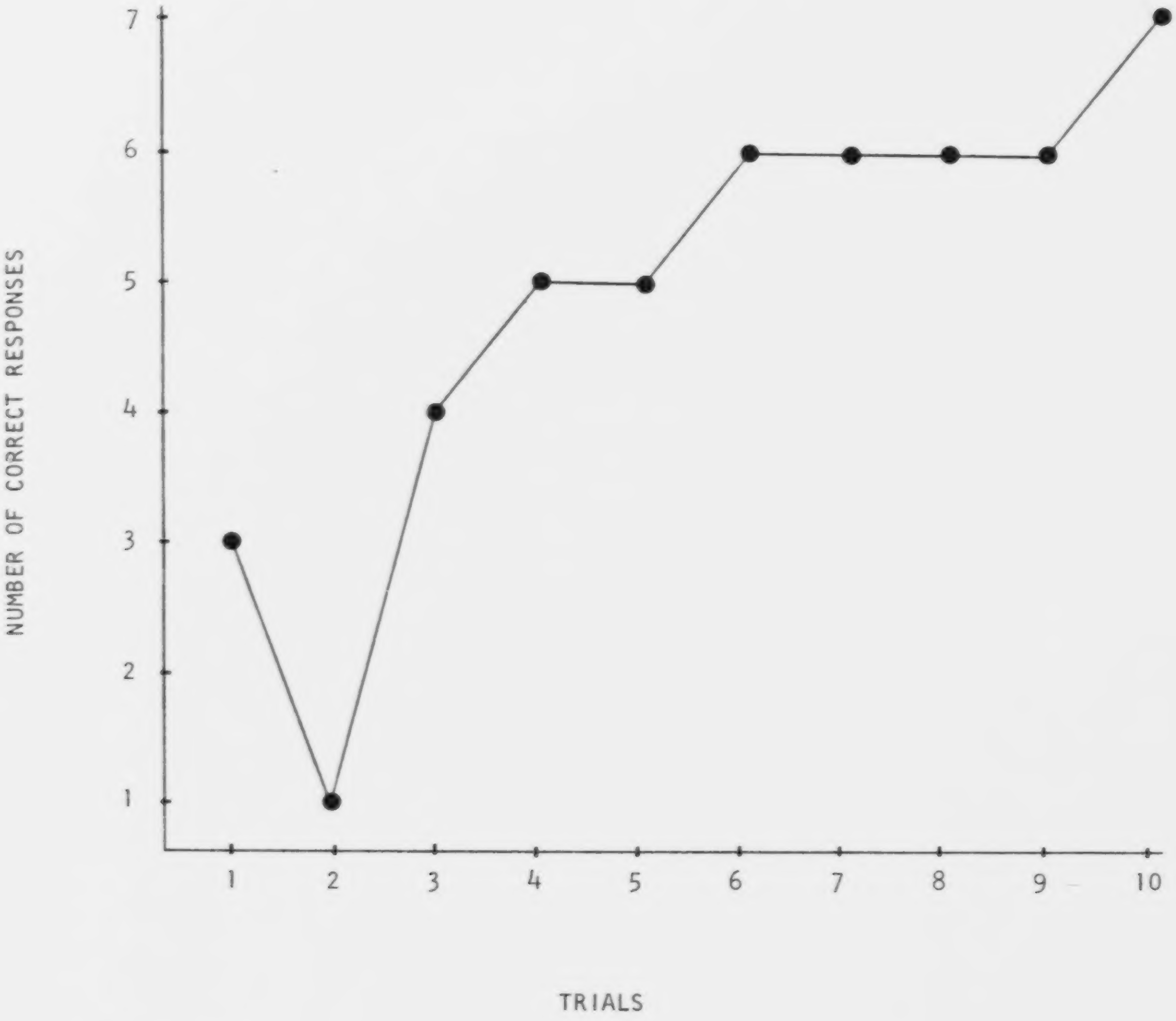
Criterion was reached when all 10 S's correctly labeled all 7 bread types for one trial. Also during the teaching phase, the Ss sampled one of the bread types each day.

All 10 Ss in this program reached criterion within 11 trials. Attached is a graph depicting the performance typical of Ss. As most of the acquisition curves are similar to those presented, the presentation of more graphs would be redundant.

DATA SHEET I

Date	White Bread	Rye Bread	Bisquits	Hot Dog Bun	Hamburger Buns	Toast	Dinner Roll	Total
S_1								
S_2								
S_3								
S_4								
S_5								
S_6								
S_7								
S_8								
S_9								
S_{10}								

FIGURE I



Teaching Trainable Level Retarded Students To Prepare Toast

Hope Bastian and Sara Ruff

Madison Public Schools

For a trainable retarded child to be able to live semi-independently, he must be able to prepare simple meals. Sandwiches, in their infinite variety, seem to be a food choice that trainable level students can learn to prepare. One important prerequisite to successful sandwich making is the ability to prepare toast.

After obtaining several preinstructional measures, it was found that a specific group of trainable children (ages 10-12) could not successfully make and spread butter on toast. Thus, the following program was designed to teach them the required skills.

TEACHING PROCEDURE

Phase I - Baseline

Each child was individually tested on making toast, spreading the butter on the toast, and cutting the toast. To begin the task, the child was given the verbal direction, "Make some toast." The child was not required to obtain the bread or butter but was required to obtain his plate and knife. Individual data was obtained on the following steps:

1. Put bread in the toaster.
2. Push the toaster down.
3. Take bread out of the toaster.
4. Take the appropriate amount of butter for the toast.
5. Spread the butter on the toast.
6. Cut the toast in half.

This program was supported in part by funds granted to the Madison Public Schools by the State of Wisconsin, Department of Vocational Education and in part by NICHD Grant 5 P01 HD 03352 to the University of Wisconsin Center on Mental Retardation.

Phase II - Instruction

Following baseline procedures, formal training began. The 11 children were divided into two groups (6 and 5). The classroom teacher taught one group and a student teacher taught the other.

Reinforcement

Reinforcement was determined on an individual basis. The criteria for reinforcement (eating the toast) was improvement over the previous trial or response maintenance once the student had performed at least 5 of the 6 steps correctly. Strawberry jam or peanut butter was given to a student when he made perfect toast (6 points).

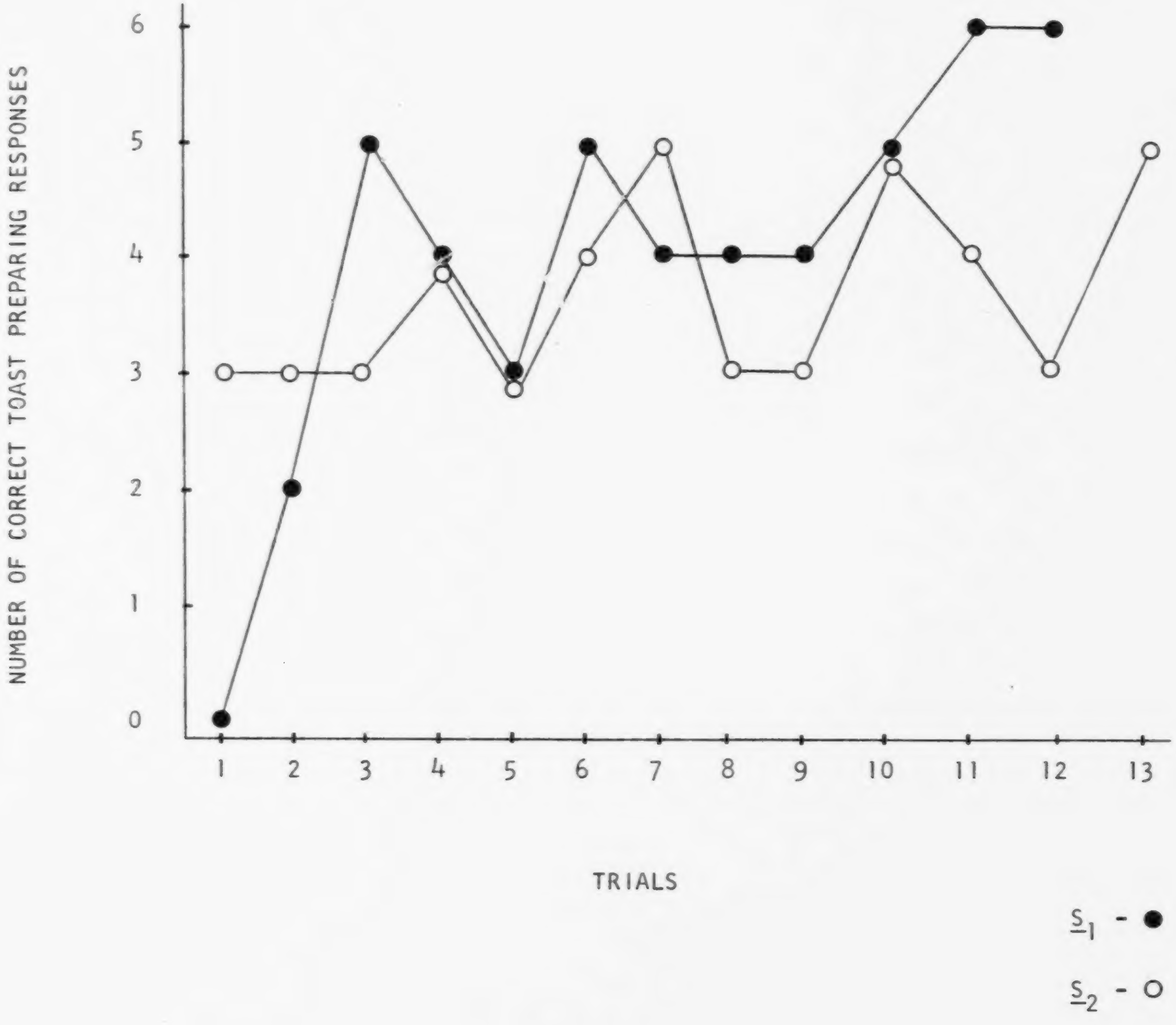
Of the 11 students who participated, 10 were successful; i.e., they prepared toast correctly on 2 consecutive days. The one student who was not successful performed only 5 of the 6 steps correctly. The performance of the one student who did not perform all 6 steps as well as the performance representative of the 10 remaining students is presented in Figure I.

The specific procedures used to teach the task are presented in detail below:

Task #	Task	Type of Error: Order Error or Performance Error	Procedure after error occurs and is recorded
1	Put bread in toaster.	Order: S begins another task. Performance: S does not put bread in toaster so it can be pushed down.	A. Non-Punitive Indication of Error: "Try another way." B. Verbal Direction: "Put bread in the toaster." C. Model: T performs task, then says to S, "Now you try it." D. Prime: T guides S through task and then says, "Now you try it."
2	Push toaster down.	Order: S begins another task. Performance: S does not push toaster so it stays down.	A. Non-Punitive Indication of Error: "Try another way." B. Verbal Direction: "Push the toaster down." C. Model: T performs task, then says to S, "Now you try it." D. Prime: T guides S through task and then says, "Now you try it."
3	Take toast out of toaster.	Order: S begins another task. Performance: S drops toast on floor.	A. Non-Punitive Indication of Error: "Try another way." B. Verbal Direction: "Take the toast out of the toaster." C. Model: T performs task, then says, "Now you try it." D. Prime: T guides S through task then says, "Now you try it."
4	Take appropriate amount of butter.	Order: S begins another task. Performance: S takes too much butter.	A. Non-Punitive Indication of Error: "Try another way." B. Verbal Direction: "Take the right amount of butter." C. Model: T performs task, then says, "Now you do it." D. Prime: T guides S through task then says, "Now you try it."
5	Spread butter on toast.	Order: S begins another task. Performance: S tears toast while spreading toast.	A. Non-Punitive Indication of Error: "Try another way." B. Verbal Direction: "Spread butter on your toast without tearing it." C. Model: T performs task on another piece of toast, then says, "Now you try it." D. Prime: T guides S through task.

Task #	Task	Type of Error: Order Error or Performance Error	Procedure after error occurs and is recorded
6	Cut toast in half.	Order: S begins another task. Performance: S tears toast or does not cut in half.	A. Non-Punitive Indication of Error: "Try another way." B. Verbal Direction: "Cut your toast in two even pieces." C. Model: T performs task on another piece of toast, then says, "Now you try it." D. Prime: T guides S through task.

FIGURE I


NUMBER OF CORRECT TOAST PREPARING RESPONSES
0
1
2
3
4
5
6
1
2
3
4
5
6
7
8
9
10
11
12
13
TRIALS
$\underline{S}_1$ - ●
$\underline{S}_2$ - ○

Introduction

Pre-Vocational Training

The primary purpose of the pre-vocational training component of the Badger school program is to attempt to provide the students with as many vocationally relevant training experiences as practical. It is assumed that the more vocationally skillful the students are, the more probable it is that they will be able to function effectively in a community vocational setting.

Thus, attempts have been made to secure vocational tasks that represent the kinds of work available to trainable level adults in the Madison, Wisconsin area. In Part I of this series (Brown, Bellamy, and Sontag, 1971) several pre-vocational training programs were described. The programs presented here are, in effect, a continuation of the programs presented in Part I. Again, as is the situation in relation to the Home Living component of the Badger school program readers should realize that the programs described here are presented primarily to communicate the model upon which the programs are based. In no sense should it be construed that the program de-emphasized the importance of social relationships, the need for more complex tasks, for work-study arrangements, travel skills, etc.

Finally, it should be noted that the pre-vocational component of the program is concerned with providing training for as many students on as many tasks as possible. This orientation in itself precludes the meeting of production quotas and financial arrangements with local workshops. It should also be noted that the activities of the pre-vocational component can only develop concomitantly with new views of the purpose of public school training programs, child labor regulations, negotiated and unnegotiated unior arrangements, parential expectancies, etc. Hopefully, the solutions to these, and other problems, can be approximated in the future so that the staff can provide more efficient, relevant and flexible pre-vocational training experiences.

L.B.
E.S.

Effects of Interval Payment, Task Choice and High Rate Reinforcement Contingencies on the Production Rate of Trainable Level Retarded and Severely Emotionally Disturbed Students.

Lou Brown, Robin Frank, Lucy Fox,
Robert Voekler, Bob York and Edward Sontag

University of Wisconsin and Madison Public Schools

It has become apparent that trainable level retarded and severely emotionally disturbed students must be prepared to function within community vocational settings in order to become a viable contribution to their community. In addition, it is felt that the public schools will become increasingly responsible for this vocational training. With these two considerations in mind, the Madison Public School system has developed a pre-vocational workshop to aid in the vocational training of trainable level retarded and severely emotionally disturbed students.

One of the most important aspects of successful functioning in a community work setting is the workers ability to perform the required job skills accurately and to such a degree that the employer realizes a profit from the efforts of the worker (Gold, 1972; Brown, Johnson, Gadberry, & Fenrich, 1971; Brown & Pearce, 1970; Brown, Van Deventer, Perlmutter, Jones, & Sontag, 1972). Oftentimes a worker can perform a job task accurately, but not at a rate sufficient for the employer and employee to realize reasonable remuneration for their energy and involvement. In this program students who could perform three different work skills accurately were involved in an attempt to investigate the effects of different payment conditions and work arrangements on their rates of production.

The entire program was divided into the following four phases:

Phase I - Baseline (no payment)

This program was supported in part by funds granted to the Madison Public Schools by the State of Wisconsin, Department of Vocational Education and in part by NICHD Grant 5 P01 HD 03352 to the University of Wisconsin Center on Mental Retardation.

Phase II - Weekly payment
Phase III - Weekly payment plus choice of task
Phase IV - High rate contingency

In Phase I, the students were instructed to perform three different work tasks as accurately and as fast as they could.

In Phase II, the students were instructed to work as accurately and as fast as they could on the three work tasks. In addition, they were told that at the end of a specified period of time they would receive a fixed amount of money in return for their efforts. It was assumed that the conditions described here are reasonably representative of the payment conditions existing in community vocational settings.

In Phase III, the students were instructed to work as accurately and as fast as they could. In addition, they were instructed: A) to select the task that they enjoyed working on themost, and B) that at the end of a specified time period, they would receive a designated amount of money. It was assumed that if individual preferences were taken into consideration, production rates would increase and error rates would decrease.

In Phase IV, the students were told to work as accurately and as fast as they could on the three work tasks. They were also told that they would receive a designated amount of money for each session in which their completed amount of work exceeded the highest amount completed in any past session.

METHOD

Students ($\underline{S}$s)

$\underline{S}_1$ was 17 years and 7 months of age. Psychological reports indicated that on the WAIS he had obtained a Performance IQ score of 48; a Verbal IQ could not be obtained due to lack of verbalization. Statements such as "able to respond on only low level items in a formal setting", and "reacts in a severe fashion to any task that he perceives at all frustrating" were contained in his cumulative folder.

$\underline{S}_2$ was 18 years and 5 months of age. Psychological reports indicated that on the WAIS he had obtained a Performance IQ score of 64, a Verbal IQ score of 61, and a Full Scale IQ score of 60. Statements such as "distractibility", "short attention span" were contained in his cumulative folder.

$\underline{S}_3$ was 17 years and 3 months of age. Psychological reports indicated consistent IQ scores of 64. Statements such as "can attend to a task only a few seconds" and "appears to have a rather limited intellectual potential" were contained in his cumulative folder.

Materials and Work Arrangement

Task I: Index Cards (See components of task)

Four stacks of white 3" x 5" index cards, separated into packs of 50 by a 3" x 5" green index card, were placed on a table. An 8" x 5" x 3" wooden jig was taped to the table immediately in front of S. The center third of the jig was recessed 3/4" to accommodate a stack of index cards. A stack of 8" x 4" light weight white paper used to wrap each pack of cards was placed to the left of the jig. A cellophane tape dispenser containing a roll of 5/8" tape was taped to the table to the left of the paper. A cardboard box for completed packs was placed on the right side of S.

Task II: Collating

One four well wooden collator was placed on a table. Four different colors (green, yellow, pink, white) of 8½" x 11" paper were used. The bottom well of the collator contained 100 pieces of green paper, the next highest wells contained 100 pieces of yellow, pink, and white paper respectively.

Task III: Drapery Hooks

Two hundred and fifty metal links and 250 plastic hooks were put in separate boxes and placed on a table. An empty box was provided for completed drapery hooks.

Two tables were used for the work tasks. The index cards and collator were on one table, the drapery hooks on the other. Ss were rotated so that each S worked at a different task in consecutive periods. A kitchen timer was used to time each trial. The entire program was conducted in a public school pre-vocational workshop and was supervised by a practice teacher and a research assistant.

Components of Tasks I, II, and III

Task I: Index Cards

1) S removes the green card from the stack of white cards.
2) S picks up the pack of 50 cards.
3) S takes one strip of wrapping paper.
4) S places wrapping paper and places it on the jig.
5) S places the pack of index cards in the middle of the wrapping paper (recessed part of jig).
6) S folds left flap down on the pack of cards.
7) S folds right flap down on the pack of cards.
8) S holds the wrapping paper together with his hand and tears off tape.
9) S tapes the wrapping paper together.
10) S places completed pack of cards in the empty box provided.

Task II: Collating Booklets

1) S takes paper from bottom well with his right hand and places it in the palm of his left hand.
2) S takes paper from next well (Well 2) and places it on top of the green paper.
3) S takes paper from well 3 and well 4 respectively and places the papers on top of each other.
4) S places completed booklet on the table.
5) S collates another booklet in the same manner and puts it across the completed one (cross-hatches).

Task III: Drapery Hooks

1) S takes metal link with left hand.

2) S takes white plastic hook with right hand.

3) S slides white plastic hook onto metal link.

4) S places completed hook into box provided.

Payment Conditions

Phase I - (Baseline) No Payment - Production of each S on each of the three tasks was measured. Ss were seated at their tables and told by T, "I am going to see how many (drapery hooks, index cards, or booklets) you can produce in 15 minutes. When I say 'Go' begin. At the end of 15 minutes the bell will ring. Finish the one you are working on and stop." At the end of each 15 minute session, T removed the completed materials from sight and counted them.

Baseline conditions lasted three days and Ss completed two 15 minute sessions during the one hour period of each day. On day one Ss worked on task one, day two on task two and day three on task three. No monetary consequences were in effect and no feedback of production was given. Two measures of production on each of the three tasks were obtained for every S.

Phase II - Weekly Payment - Ss worked two sessions per day for four days or a total of 8 sessions per week. The instructions given each S were the same as in Phase I except Ss were told they would receive a weekly payment of $1.50 for their work. Tasks were again rotated across days, with all Ss working two sessions per day at the same task. Thus Ss performed task one on days 1, 4, 7, ..., task two on days 2, 5, 8, ..., and task three on days 3, 6, 9, ... These procedures were continued until each S had the opportunity to work at each of the three tasks for eight 15 minute sessions. Accordingly, on three consecutive Fridays, Ss received $1.50 for their efforts.

Phase III - Payment conditions were designed to be exactly the same as in

Phase II with the exception that each S was allowed to choose the task on which he worked. However, during the two weeks of Phase II, one hour period each week was missed (fire drill, holiday) and S completed 6 sessions per week instead of 8 or a total of twelve 15 minute sessions.

Phase IV - Ss were again assigned tasks I, II, and III on consecutive days. Instructions were the same except Ss were told they would receive $ .25 per session, if they produced more work units per session than they had ever produced on that task in any prior session. Money earned in the sessions was totaled and delivered on Friday as before. This phase was in effect for three weeks, until each S had the opportunity to work on each of the three tasks for eight 15 minute sessions.

RESULTS

In Phase I, S_1 produced an average of 24.5, 58, and 54 work units on tasks I, II, and III respectively (Table 1 & Figure I), S_2 averaged 29, 43.5, and 44 (Table 1 & Figure II) and S_3 averaged 31.5, 56.5, and 125.5 (Table 1 & Figure III).

In Phase II, S_1 produced an average of 24.5, 47.1, and 53.1 work units on tasks I, II, and III respectively, S_2 averaged 31.6, 44.5, and 55.5, and S_3 averaged 31.9, 61.5, and 117.1.

In Phase III, Ss 1, 2, and 3 produced an average of 25.5, 36.2, and 149 work units respectively on the task of their choice. S_1 and S_2 chose task I index cards and S_3 chose task III drapery hooks.

In Phase IV, S_1 produced an average of 30.6, 92.5, and 88.6 on tasks I, II, and III respectively, S_2 averaged 40.6, 58.6, and 77.4 and S_3 averaged 46.6, 79.1, and 161.6.

Error rate showed a marked decline as the study progressed. During the eighteen 15 minute sessions in Phase I, a total of 21 errors were recorded. In Phase II, consisting of seventy-two 15 minute sessions, a total of 24 errors was recorded. During the thirty-six 15 minute sessions of Phase III and the seventy-two 15 minute sessions of Phase IV only 1 and 4 errors respectively were recorded.

DISCUSSION

A major criticism of the literature for the retarded is the lack of definable training techniques (Gold, 1972). The purpose of this program was to investigate specific payment conditions that might prove useful in facilitating an increase in the rates of production of trainable level retarded and severely emotionally disturbed students in a public school, pre-vocational training program. This program was an attempt to systematically control and manipulate predefined environmental variables and measure the effects. Although the program was conducted in a simulated workshop environment, conclusions should also be useful in planning programs in community workshops.

In Phase I, measures of productivity were obtained in the absence of monetary, and intentional social reinforcers. It was assumed that under these conditions productivity would be relatively low.

In Phase II, payment conditions that were essentially the same as those employed in many community workshop settings were introduced. The worker was assigned a task, told to work as quickly and accurately as he could, and collected a designated amount of money at the end of the week. It was assumed that this arrangement would encourage the workers to perform the work task more efficiently than the arrangement in Phase I. However, since the Ss received the same amount of money regardless of the rate of production, it was believed that this condition would not yield the highest amount of productivity.

In Phase I, the combined production of all three students yielded averages of 28, 53, and 74 work units on tasks I, II, and III respectively. In Phase II the combined averages of the students were 28, 51, and 75. Thus, it can be discerned that the weekly payment contingency had negligible effects on the average production of the students.

In Phase III it was assumed that the added element of choice would be a significant variable in increasing the average production of the students. However, the average production rate of $\underline{S}_1$ was only 25.5 work units as compared to a baseline figure (Phase I) of 24.5. The slight increase in average production between Phase II (21.4) and Phase III (25.5) appears to be a function of more consistent performance in Phase III, rather than an increase in production. $\underline{S}_2$ does show a moderate increase in average production between Phase II (31.6) and Phase III (36.2). $\underline{S}_3$ also shows a moderate increase in average production between Phase II (117.1) and Phase III (149). Thus, for two of the students working on their preferred task did have a moderate effect upon average production of work units.

In Phase IV (high rate contingency), the combined production of all three students yielded averages of 39, 76.5, and 109 work units on tasks I, II, and III respectively. The average production for all students on all tasks was the highest of any program condition.

No attempts were made to directly influence the number of errors made by the students. However, errors dropped markedly in the early phases of the program to near zero at the end. This decrease is assumed to be the result of increased practice at the task and the indirect punishment of errors by the exclusion of incorrect work from the count of units produced.

The moderate increase in average production described in Phase III is subject to some confounding due to the decreased number of work sessions per week during this phase. The unavoidable loss of 4 work sessions resulted in each of of the remaining sessions being worth more money to the student in terms of the number of work sessions performed per money earned. In Phase II each session was worth approximately $ .19, in Phase III each session was worth $ .25. However, this effect is believed to be inconsequential and that the production increases were probably due to the choice variable.

A similar problem occurred in Phase IV when the high rate contingency was in effect. Assuming that a student increased his production rate each day it was possible to earn as much as $2.00 per week. Thus, increases in average production may not have been due to the high rate contingency, but to the potentially increased consequence ($2.00 versus $1.50). Again, it is believed that the increase in production was the result of the high rate contingency, but more precise controls are necessary before such a hypothesis may be held tenable.

Nevertheless, despite the design problems delineated above as well as potential ceiling effects on some tasks, the absence of reversals or multiple baseline manipulation etc., the fact remains that the performance of the students at the end of the program was substantially improved over their initial performance. From a practical prevocational training point of view the obtained increase in production rates, however small, is encouraging and again makes salient the need for those responsible for teaching handicapped students to constantly search for environmental arrangements that might improve the behavioral repertoire of the students in their charge.

TABLE I

AVERAGE NUMBER OF WORK UNITS PRODUCED

		Phases			
		I	II	III	IV
S_1	Task I	24.5	21.4	25.5	30.6
	Task II	58	47.1		92.5
	Task III	54	53.1		88.6
S_2	Task I	29	31.6	36.2	40.6
	Task II	43.5	44.5		58.6
	Task III	44	55.5		77.4
S_3	Task I	31.5	31.9		46.4
	Task II	56.5	61.5		79.1
	Task III	125.5	117.1	149	161.6

Task I - Index Cards

Task II - Collating

Task III - Drapery Hooks

FIGURE I

S_1

PHASES

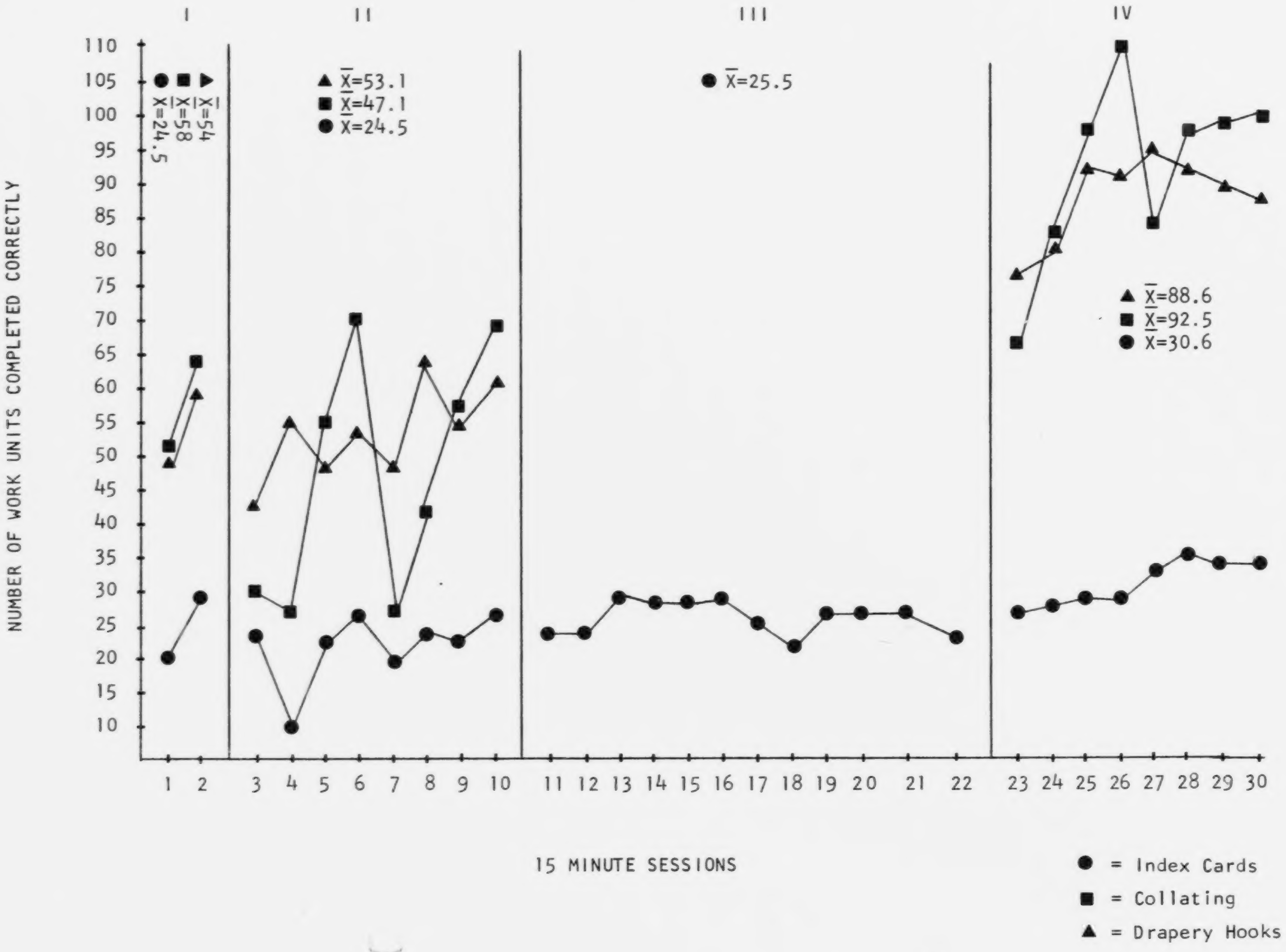


FIGURE II

S_2

PHASES

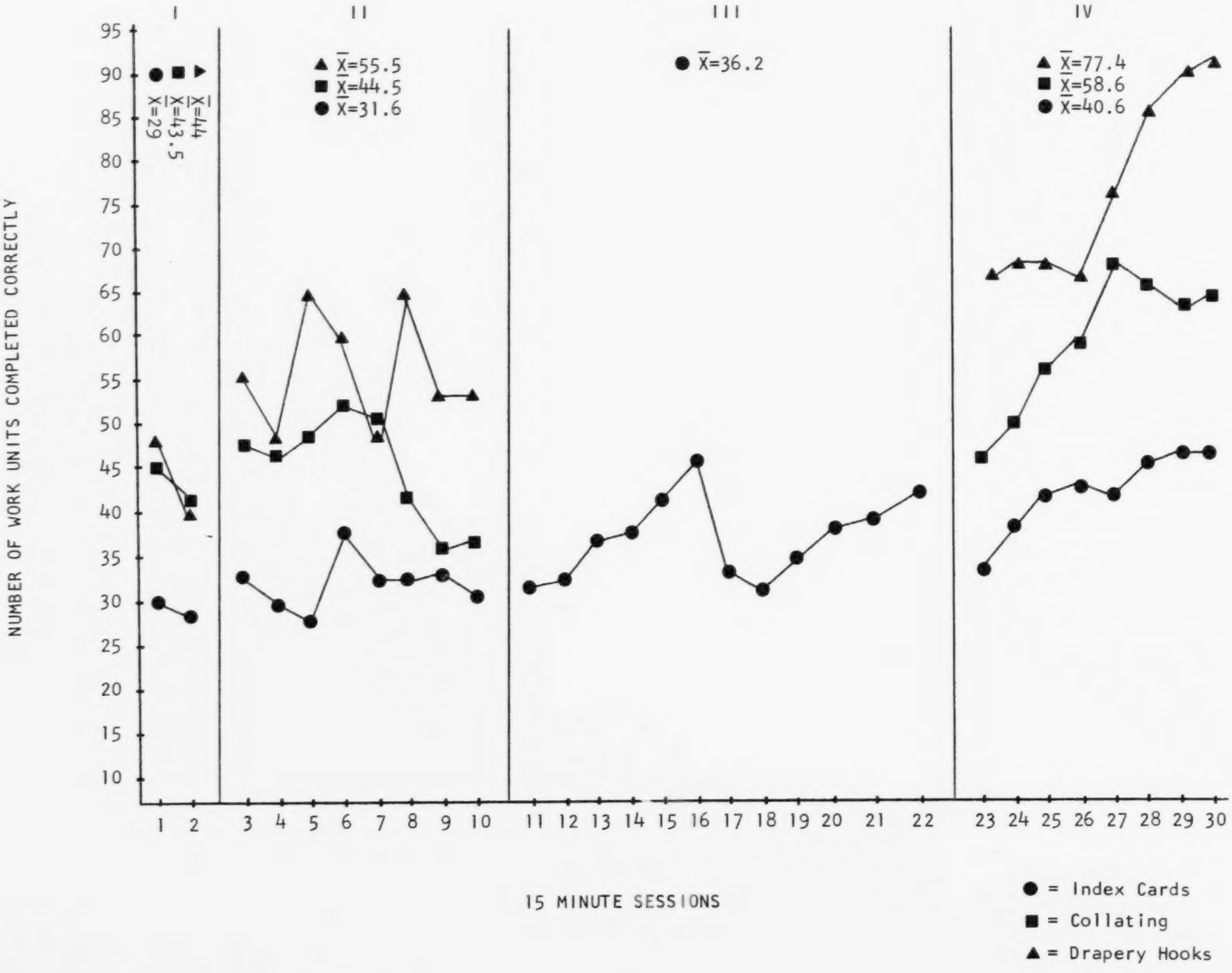
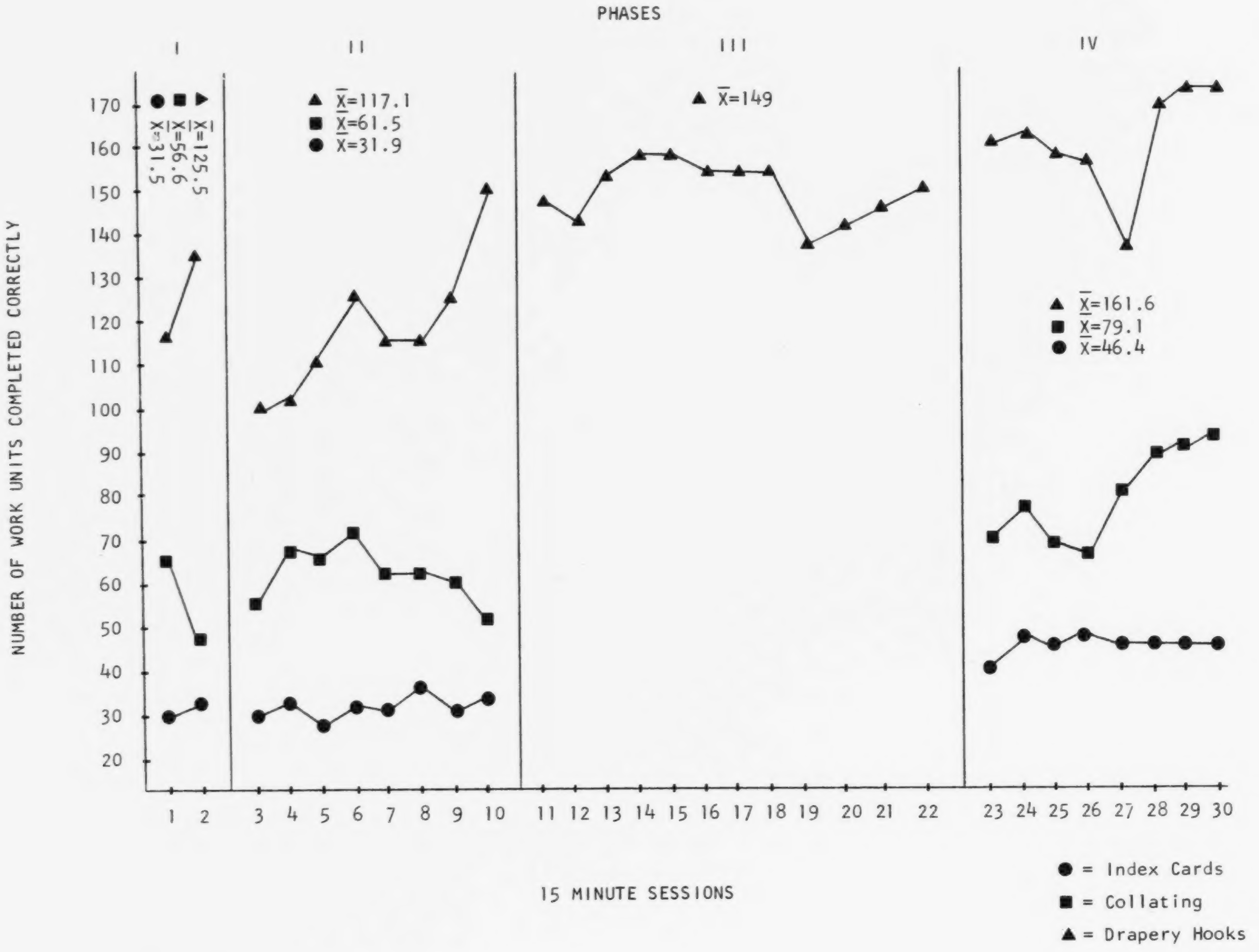


FIGURE III

S_3



XXVIII

Teaching trainable level retarded and severely emotionally disturbed students to assist in the recycling of standardized test booklets.

Lucille Fox, Sue Hamre, and Edward Sontag

Madison Public Schools

The following is a report of how a group of trainable level retarded and severely emotionally disturbed students were taught to perform work skills related to the recycling of educational test booklets used by the Testing Bureau of the University of Wisconsin. In addition to teaching the students to perform the recycling task accurately, work incentives were arranged in the hope that the production rates of the students would increase.

The University of Wisconsin Testing Bureau administers thousands of achievement and placement tests every year and the booklets related to these tests are recycled by college students during the summer months. When this information became available to the staff of the Badger school program, an arrangement was made between the University and the public schools, whereby the public schools could use the work that had to be done in order to recycle the test booklets as training tasks for the students in the Badger school program.

The tasks were particularly relevant to the Badger School Prevocational Program in that they provided the students with the opportunity to learn and practice such necessary vocational skills as:

A) the ability to make relatively complex visual discriminations;
B) following complex verbal directions;
C) the performance of reasonably complex psychomotor movements;
D) performance of work behaviors at high rates.

The entire program was divided into two parts. In Part I the students were taught to perform selected recycling skills accurately (e.g., scanning for marks, erasing). In Part II incentives were arranged that were designed

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This program was supported in part by funds granted to the Madison Public Schools by the State of Wisconsin, Department of Vocational Education and in part by NICHD Grant 5 P01 HD 03352 to the University of Wisconsin Center on Mental Retardation.

to increase the rates at which the students were initially completing their recycling responsibilities.

METHOD

Students (Ss)

Forty-seven Ss enrolled in public school classes for trainable level retarded and severely emotionally disturbed students were involved in the program. Ss ranged in CA from 14-7 to 21-2 years ($\bar{X}$=17-9), in MA from 4-9 to 10-6 years ($\bar{X}$=7-8), in IQ from 28 to 71 ($\bar{X}$=49.5) and in years in school from 9 to 16 ($\bar{X}$=12.5) years.

These Ss had been previously ascribed such labels and descriptors as "poor motor coordination, moderately retarded, limited memory, poor vision, inability to progress, high level of anxiety, fearful to undertake new tasks, manifests difficulty in holding a pencil, slow in responding, severely retarded, slow in movements, easily distractible, severely emotionally disturbed."

Five different classes (groups) rotated through the workshop. Each group participated in the workshop program for at least three 45 minute periods per week.

Materials and Work Arrangement

Three Ss were seated at each table in the school workshop with the following materials in front of each S:

1) Ten 8½" x 11" University test booklets. Booklets contained from 7-15 pages each. Examples of the test booklets used are listed in the reference section of this paper.
2) A ½" x 2" rubber eraser, used to erase pencil or dirt marks.
3) A 12" straight edge ruler, used to delimit the visual field.
4) 3½" rubber bands, used to bind a stack of 20 booklets together.
5) A yellow construction paper circle, 3" in diameter, used as a visual stimulus on which completed booklets were places.

Each table also contained the following materials:

1) One cellophane tape dispenser containing a roll of ½" tape.

2) A "Swingline 27" stapler used to repair unstapled booklet pages.

A model of the work arrangement is attached.

All teaching was conducted in the "Pre-vocational" workshop by the classroom teacher (T) or student teacher. Data sheets were constructed to record the number of booklets (correct and incorrect) each S produced. A bar graph (24" x 30") was constructed for each group and contained a continuous record of each S's progress (simulation attached). Pennies and nickels were used as additional incentives. A kitchen clock was used to time work periods.

Part I - Teaching the Components of the Task

The task included the following components:

1) S takes one booklet from the pile in front of him.

2) S scans each page of the booklet, guiding his field of vision by moving a ruler from the top to the bottom of the page.

3) When S finds a pencil or dirt mark on a page, he places the ruler on the table and picks up his eraser and erases that mark.

4) If S finds a torn page, he calls out to T who tapes the tear.

5) If S finds an unstapled page, he calls out to T, who staples the page.

6) After scanning and cleaning an entire booklet, S places it on top of the yellow circle.

Subsequently, T checked each completed booklet for errors (dirt marks, pencil marks, tears, etc.). If an error was detected, it was pointed out to the student and the booklet was placed in a pile to be recycled at a later time.

The teaching procedure consisted of T explaining, "Your new job is called recycling. You will be looking for pencil marks, dirt marks, tears, and unstapled pages in the booklets. If you find pencil marks, or dirt marks you are to erase them. If you find a tear or a page that is not stapled in the booklet you are to raise your hand, and I will help you fix it." T then modeled the scanning and cleaning process as well as delineating tears and unstapled pages.

Ss were then given all necessary materials and told to "work for 20 minutes". If an individual S did not seem to be working, T repeated her directions for him and modeled the correct procedures. A priming procedure was used for students who did not work after repeated modeling. These procedures were followed until each S received practice scanning, cleaning and reporting defects in three different test booklets.

Part II - Increasing Production Rates

After Ss had received practice on the recycling task, attempts were made to increase the rate at which they produced completed booklets. This part of the program was divided into two steps.

The first step (baseline) determined how many booklets each S could recycle correctly without verbal or physical aid from T. In this step, T said to a group, "You are going to work for 20 minutes today to see how many booklets you can recycle. I am going to set the timer. I see all of you have your materials ready. Begin!" During the 20 minute period, T checked completed booklets for errors and recorded the number of correct and incorrect booklets completed by each S. At the end of the 20 minutes, the timer bell sounded and T said, "Stop. Put your rulers down." T checked completed booklets which had not been previously checked and recorded. No feedback concerning accuracy or rate was given during this step.

After baseline rates were established, incentives were arranged in the following manner: T presented a large bar graph showing baseline production rates and said, "After you work today, I will color on this graph to show how many booklets each of you has completed in 20 minutes. You will be paid 1¢ for every ____ (the number of completed booklets necessary for S to earn one cent was 2, 3, or 5, depending upon the length of the booklet) booklets you complete without errors. Work quickly and carefully. Begin!" The same directions were given to each group. This phase continued until the end of the school year.

RESULTS

The recycling task had not been utilized in local competitive workshops. Therefore, competitive employment norms were not available. Before instruction was initiated, norms were obtained by asking 5 teachers to scan and clean booklets as quickly as possible for 20 minutes. Teachers' rates ranged from 15 to 25 ($\bar{X}$=20) for the 20 minute period.

T checked each completed booklet for accuracy. If an error was found, it was immediately identified for the student. Booklets with errors were not included in the total number completed by each individual. The most common error was to overlook a small pencil mark on a page.

Although individual production rates varied, low, medium, and high levels of production emerged. The graphs of three Ss considered representative of these levels are presented. (It should be reiterated that a total of 47 Ss were involved in the program but space precludes inclusion of all data).

During the three 20 minute baseline sessions, Ss 1, 2, and 3 correctly completed an average of 0, 3, and 4 booklets respectively (See Figure 1).

During Part II, Step 2, when charts and money were introduced, the rates of 44 of the 47 Ss, including S_1, S_2, and S_3, increased. Three Ss decreased slightly in production but attained higher rates within 4 additional sessions. The amount of increase varied widely between Ss. For example, the rates of S_2 and S_3 showed an increase of 1 booklet per 20 min. session, but several Ss (not depicted in Figure 1) showed gains of up to 16 additional booklets per 20 min. session.

DISCUSSION

The major objectives of the project were to teach the task to, and to increase the production rates of, the 47 students. On the recycling task the rates of 44 students did, in fact, increase when charts and money were introduced. The problem of the decrease in the rate of 3 Ss upon introduction of incentives does exist. Also remaining is the problem of attributing the production rate increases to specific variables.

There is at least two possible explanations of why 3 students' rates decreased when charts and money were introduced. That is, the incentives may not have been powerful enough to exact increased performance, and/or what may be an incentive for some students may not be an incentive for all. When the rates of these 3 students did increase, it may have been due to factors not readily apparent.

There was no attempt made to discern whether increases were due more to one variable than another. Thus, increases in individual production rates may be due to one or a combination of variables, e.g., charts, money, practice, teacher proximity, teacher feedback on accuracy, peer models, peer reinforcement.

One implication from the present project is that retarded students are capable of achieving higher production rates when they are in reinforcing work environments. These students need no longer be in nonreinforcing environments, such as institutions, where very little is expected of them. They can be exposed to training programs which place more demands on them and allow them to demonstrate more efficient performance.

Secondly, a public school pre-vocational training program has again shown to be potentially capable of providing successful prerequisite skill training for retarded and severely emotionally disturbed students (Brown and Pearce, 1970; Brown, Van Deventer and Perlmutter, 1971; Brown, Johnson, Gadberry, and Fenrick, 1971).

Before generalizations are made to other students on other work tasks, additional factors should be considered. Each work session was held for only 20 minutes. It is difficult to determine if these rates could be maintained for a 40 hour work week. Also, production rate is only one of several considerations, e.g., handling of money, interpersonal relationships, personal hygiene, necessary for success in future vocational settings.

References

Brown, L., Bellamy, T., Perlmutter, L., Sackowitz, P., and Sontag, E. The development of quality, quantity, and durability in the workshop performance of retarded students in a public school prevocational workshop. University of Wisconsin and Madison Public Schools.

Brown, L., Johnson, S., Gadberry, E., and Fenrick, N. Increasing individual and assembly line production rates of retarded students. Training School Bulletin, 1971, 67, 206-213.

Brown, L., and Pearce, E. Increasing the production rates of trainable retarded and severely emotionally disturbed students in a public school simulated workshop. Education and Training of the Mentally Retarded, 1970, 5, 15-22.

Brown, L., Van Deventer, P., and Perlmutter, L. Effects of consequences on production rates of trainable retarded and severely emotionally disturbed students in a public school workshop. Education and Training of the Mentally Retarded, 1972, 74-81.

Examples of test booklets

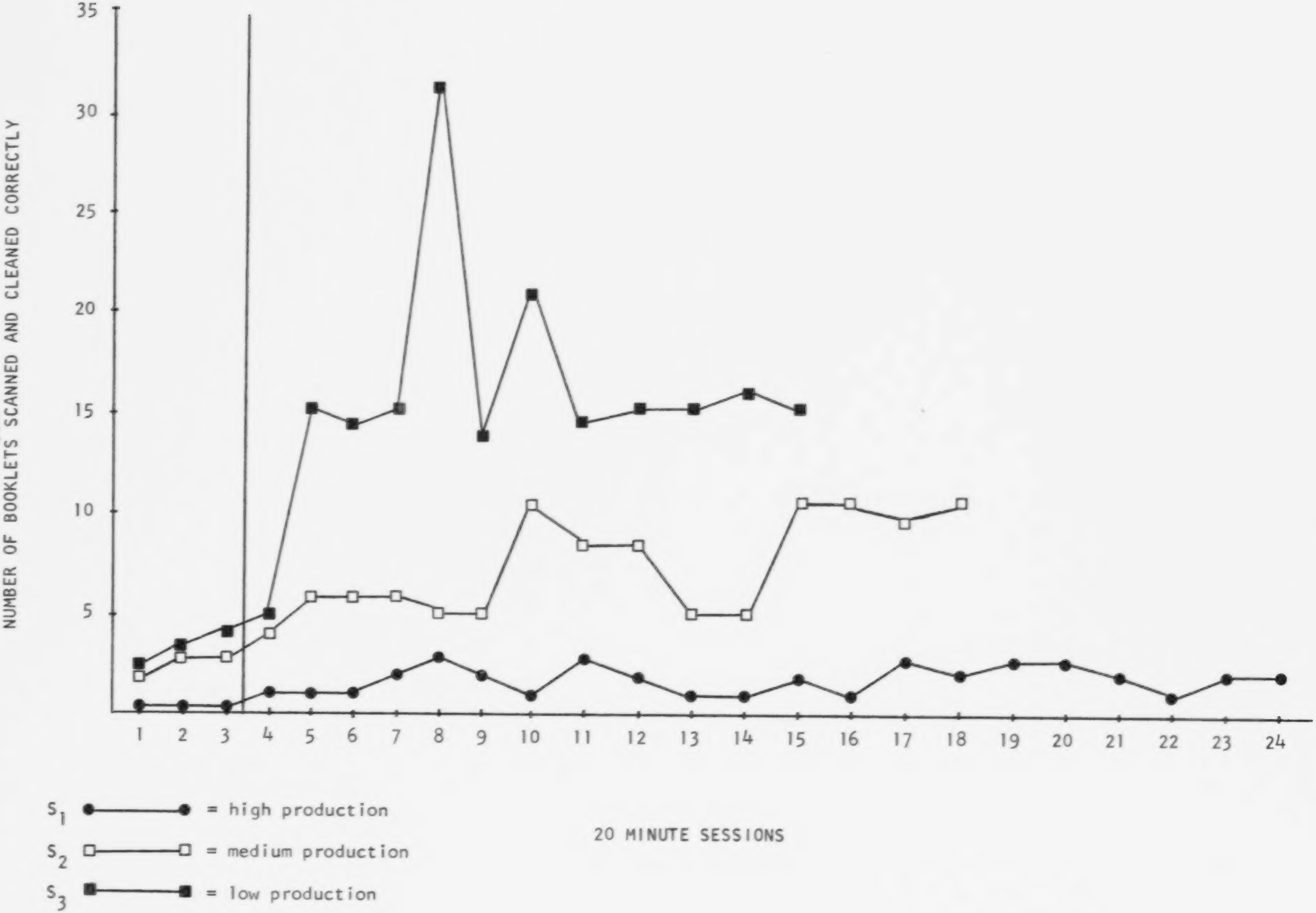
1) Sequential Tests of Educational Progress - University of Wisconsin Wisconsin State Testing Program - STEP - Series II - Science Form 3A

2) Sequential Tests of Educational Progress - University of Wisconsin Wisconsin State Testing Program - STEP - Series II - Social Studies Form 3A

3) Sequential Tests of Educational Progress - University of Wisconsin Wisconsin State Testing Program - STEP - Series II - Reading Form 3A

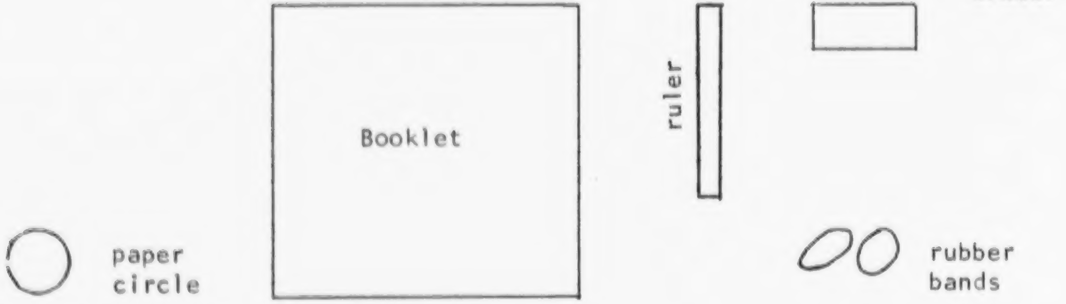
Figure I - Number of booklets scanned in 20 minute periods under different conditions: I) baseline; and II) charts and money.

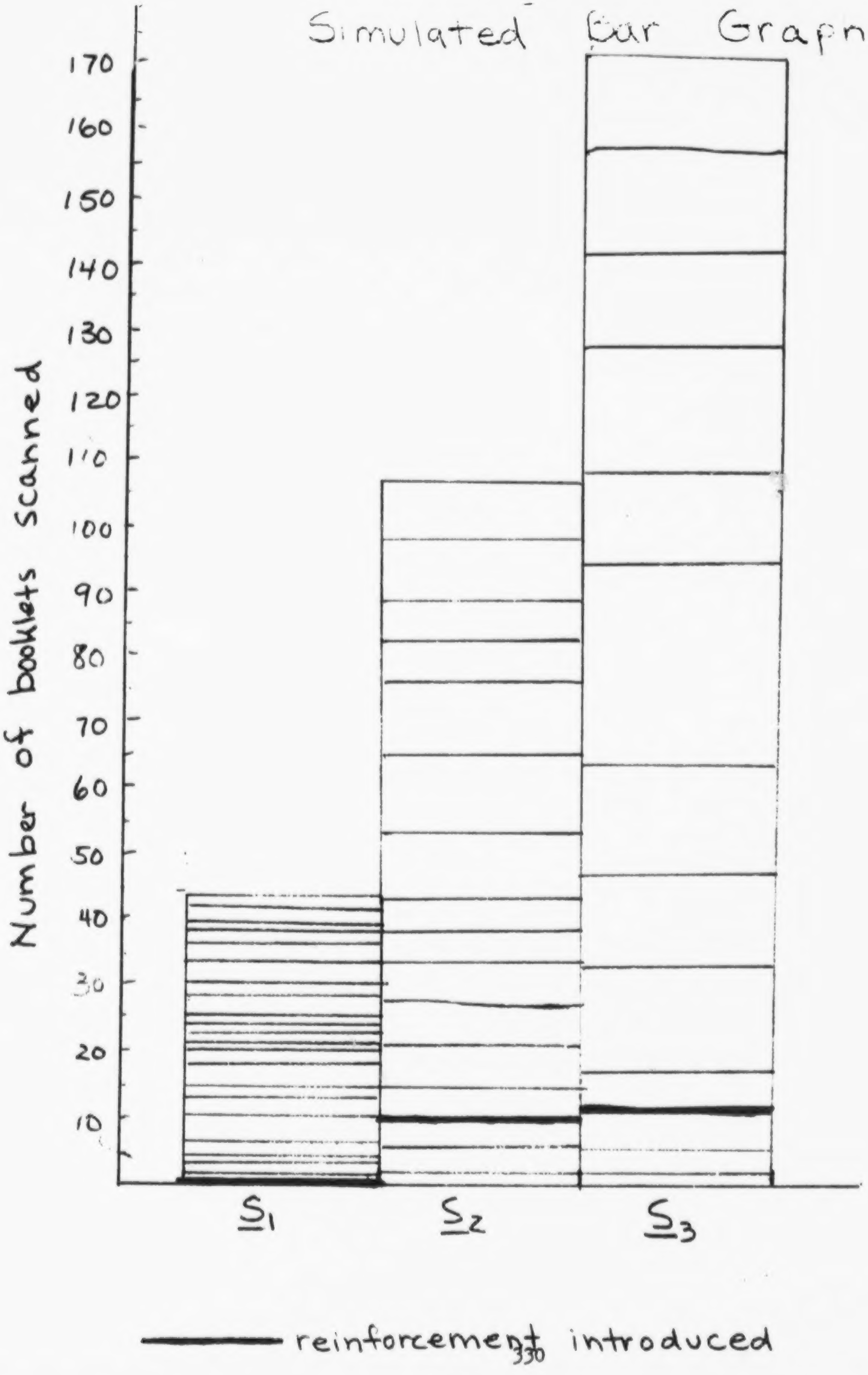
FIGURE I


NUMBER OF BOOKLETS SCANNED AND CLEANED CORRECTLY
35
30
25
20
15
10
5
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
20 MINUTE SESSIONS
S_1 ● = high production
S_2 □ = medium production
S_3 ■ = low production

WORKSPACE MODEL

Student's Work Area


eraser
ruler
Booklet
paper circle
rubber bands


Simulated Bar Graph
Number of booklets scanned
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
S1
S2
S3
reinforcement introduced

The Use Of Fund Raising Materials To Teach Prevocational Skills To Retarded Students

Lucille Fox, Sue Hamre, Roberta Waymoth, Bob York and Ed Sontag

Madison Public Schools and University of Wisconsin

For "trainable level" retarded students to function within their community the development of vocational skills appears to be crucial. Thus Badger School has attempted to incorporate the training of basic vocational skills as a part of its regular curriculum. Basically the pre-vocational workshop attempts to provide readiness workshop training for its students through the use of "real" workshop tasks. That is, tasks are selected from among those presently under contract in nearby sheltered workshops. Through these tasks the students obtain skills that are directly applicable to existing sheltered workshop situations. However, this reflects only the "vocational" part of the "pre-vocational" workshop. The "pre-" segment must concern itself with such skills as the ability to function independently and successfully in a work situation, the development of motor skills, color discriminations, number comprehension, and the ability to follow multiple directions. It is important that these skills be learned in preparation for any vocational task.

This paper describes the stuffing of envelopes for Roundy's Fun Fund and the use of this task for pre-vocational training. Since many of our students have done similar tasks in the past, this program was primarily concerned with increasing rates of production. Consequences for the completion of the task (production) were manipulated in an attempt to increase production rates. (Production rate was operationally defined as the number of envelopes correctly stuffed in a specified time period.)

This program was supported in part by funds granted to the Madison Public Schools by the State of Wisconsin, Department of Vocational Education and in part by NICHD Grant 5 P01 HD 03352 to the University of Wisconsin Center on Mental Retardation.

METHOD

Students (Ss)

The educational background of Ss engaging in the pre-vocational workshop varied. Most of the Ss had had approximately ten to twelve years of schooling. The I.Q. range was from about 30-50, and the chronological age from eleven to twenty-one years. There had been exposure to a similar task previously and Ss were easily taught to perform the basic task (envelope stuffing).

Materials

- white inserts bearing addressee's name, address, city, state and zip code
- green inserts with Roundy's picture in the left hand corner
- white windowed envelopes
- boxes (1 per student, approximately 12" x 8")
- soft drink
- nickels, containers to hold nickels
- timer
- graphs

Work Setting

The workshop had four tables which seated five Ss each, with comfortable working space. It had been previously determined that the most effective instructional arrangement for this group of Ss was to let each S work individually (Brown, Johnson, Gadberry, & Fenrick). This was done by letting each S be responsible for his own "work station" (prescribed area in front of the student where he had his materials, white inserts, green inserts, envelopes, and a box). See Figure 1.

Procedure

The instructor moved about the workshop giving instructions first to the whole group, then individually to Ss who needed it. First, the Ss were taught to discriminate and then name all the materials to be utilized, a white insert, a green insert, and the white windowed envelope. Then, the instructor modeled the task while giving the following verbal instructions.

1. Pick up "one" white insert, make sure the address is facing you.
2. Pick up "one" green insert, make sure Roundy's picture is facing you.

(At this point we used the rhyme, "One, two, facing you.")

3. Now place the white insert over Roundy's picture on the far left side.
4. Pick up one white windowed envelope.
5. Open it.
6. Put the white and green insert into the white windowed envelope.
7. Take the flap of the envelope and tuck it into the envelope. Corners should be flat.
8. Check the window on the front of the envelope and make sure you can see the name and address clearly.
9. Check to make sure you cannot see any green through the window.
10. If the envelope is correct place it in the box in front of you.
11. Begin another envelope.

According to the length of each class period and the group's ability, they were put on 15, 20, and 45 minute timings. Following each period a count was taken of each S's production.

The various consequences utilized in attempts to increase production rate follow:

1. Classroom charts containing each S's name and his daily production rate were kept in full view for each group of Ss.

2. Personal graphs were provided in addition to the classroom charts and variations in these graphs were pointed out and explained to each S.

3. 50 Club -- A special chart was posted in the workshop and Ss with a low production rate were urged to reach a goal of 50 correctly stuffed envelopes. Upon achieving the desired rate S's name was written on the 50 Club chart. Repeated performances on this level were recorded by a red star next to S's name.

4. 100 Club -- Ss with a high production level were urged to attain listing upon 100 Club chart posted in the workshop. Repeated performance levels were recorded by a red star.

5. Winner's Table -- A table was set up with special work stations for all Ss reaching either the 50 or 100 Club goal (depending on the group level). Chairs were labeled for the winners.

6. Soft Drink -- The soft drink was used as a consequence for Ss advancing to the winners table.

7. Nickels -- Monetary prizes were awarded for different accomplishments such as the highest increment or highest total for a specific timing.

8. Savings -- The slogan "Watch your money grow" was introduced and Ss were awarded a nickel for a given increment over their last production total. The group "watched their money grow" and in a plastic container with the S's name on it.

Before each timing the groups were reminded of the contingencies presently in effect.

RESULTS

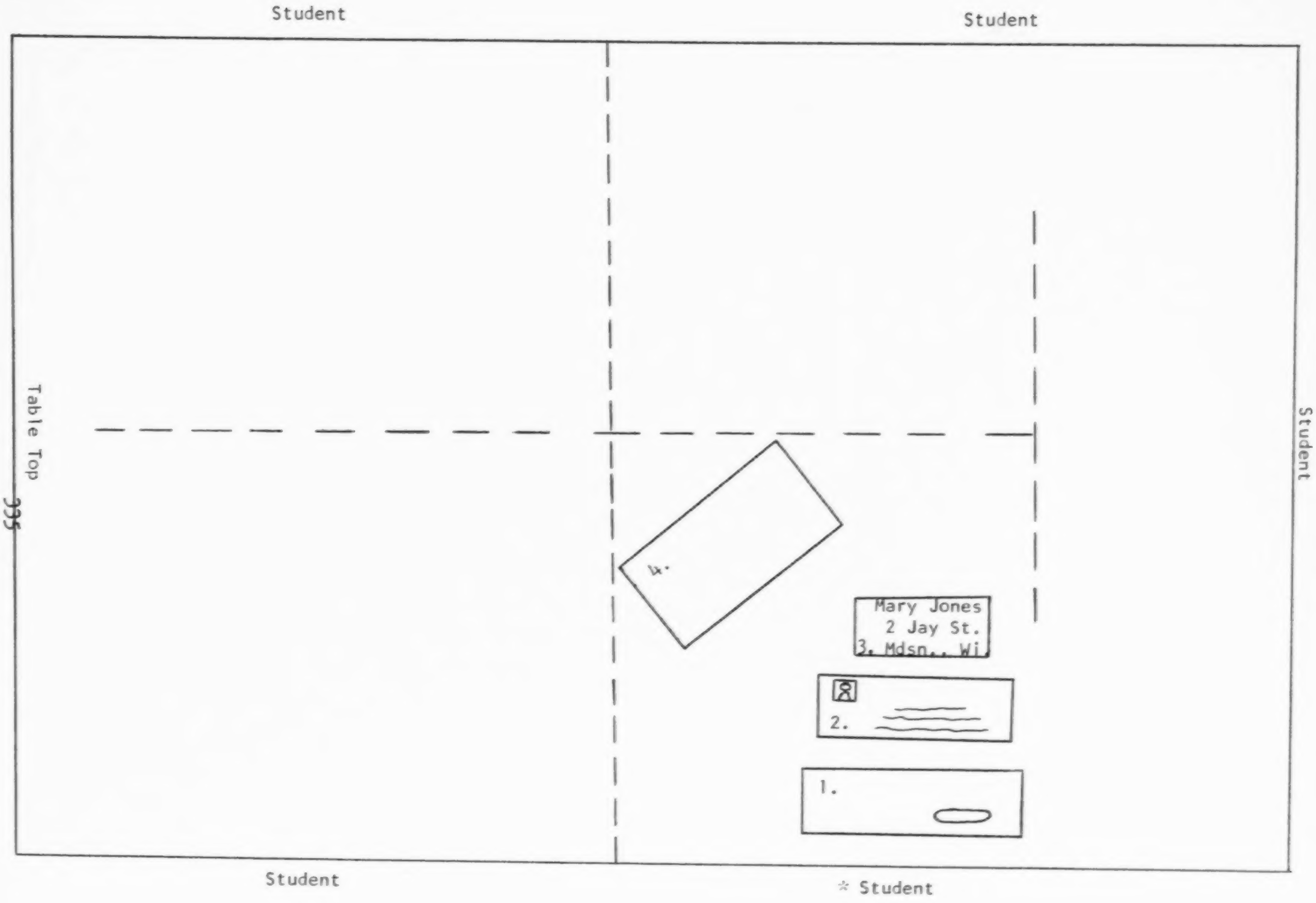
The 48 students involved in the program were divided into five groups, each group experiencing different production consequences or combinations of consequences. By the end of the task, 38 of the 48 students (79%) had increased their rate of production. Samples of three student's data are presented in Figure II (Ss 1, 2, and 3). These were selected to depict increases in production rate of zero, small and large magnitudes. These graphs are typical of the remaining data and represent the most frequently encountered outcomes of the program.

DISCUSSION

Since many of the students had already participated in earlier workshop tasks involving envelope stuffing, acquisition of this particular skill was not the primary focus of this program. Instead, a number of production consequences were introduced in an attempt to increase production rates. In general these consequences were effective and increased the rates of production of 79% of the students. Attributing these increases in production to specific production consequences cannot be attempted until a more systematic manipulation of these consequences is accomplished. Demands of the contract deadline and the pilot nature of this program limited the number and complexity of the manipulations that could be attempted.

As a training exercise this program was quite successful, the students have learned a specific task skill that is marketable within present sheltered workshops and successfully stuffed a total of 29, 939 envelopes while meeting the contract deadline. A pen and pencil set was presented to each student by the Roundy's Fun Fund Committee as an unexpected bonus for their participation in the project.

FIGURE I

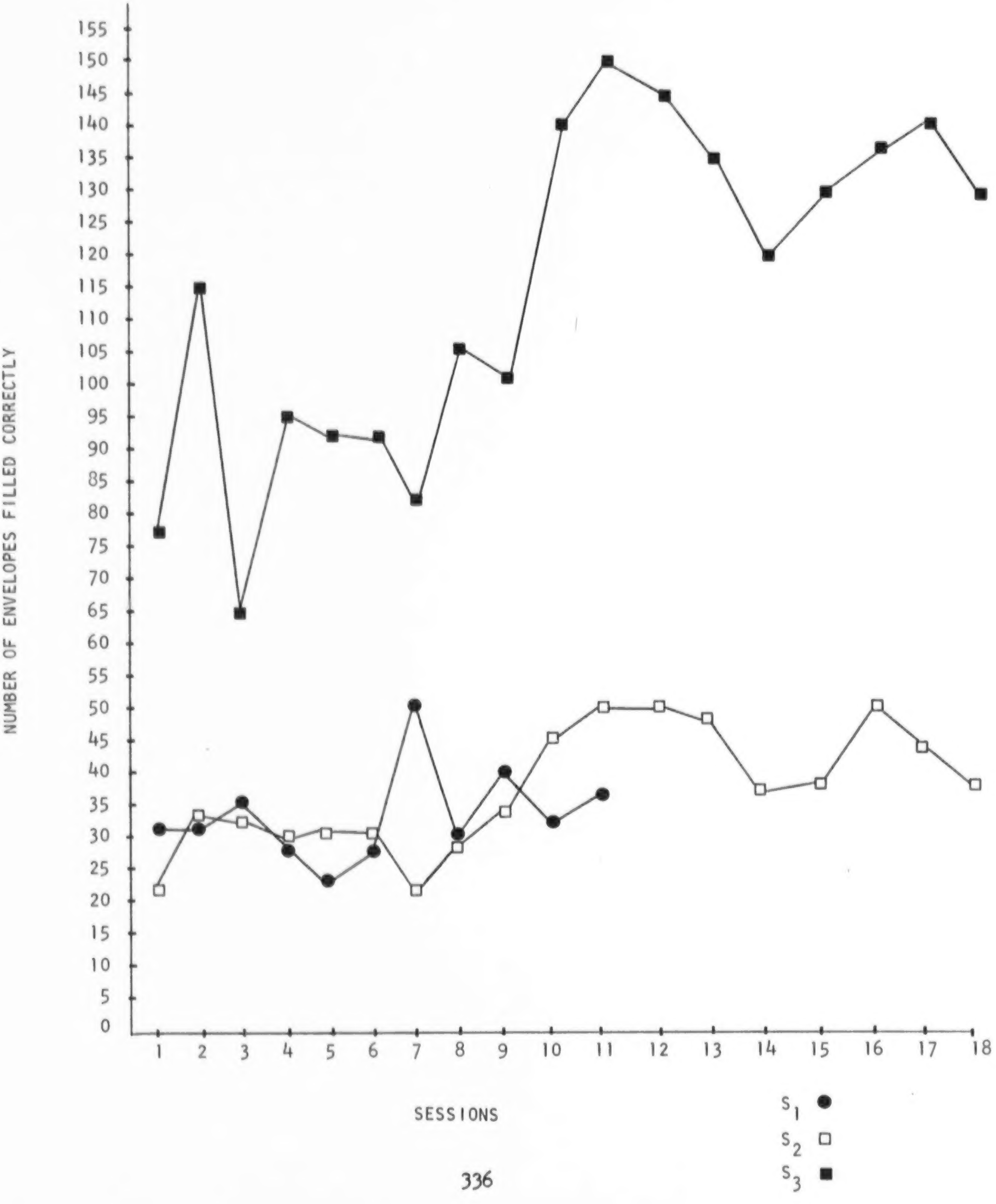

Student
Student
Table Top
Student
Student
* Student
Mary Jones
2 Jay St.
3. Mdsn., Wi.
2.
1.
4.

Instructional Arrangement

* Each student had same set up.

1. White windowed envelope
2. Green insert
3. White insert
4. Empty box

FIGURE 11


NUMBER OF ENVELOPES FILLED CORRECTLY
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
105
110
115
120
125
130
135
140
145
150
155
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
SESSIONS
S1 ●
S2 □
S3 ■

Teaching Retarded Students to Assemble Promotional Material for the State of Wisconsin, Department of Natural Resources[1]

Lucille Fox, Barbara Swetlik, Sue Hamre, Lou Brown and Ed Sontag[2]

Madison Public Schools and University of Wisconsin

The primary objective of this program was to teach retarded students several basic work skills required to succeed on assembly tasks in the hope that such skills would ultimately allow them to function effectively in a community vocational setting. In addition, the program was designed to approximate the realization of several other necessary instructional objectives:

A) to provide the students with an opportunity to work for money;

B) to teach the students to work accurately (quality), but also quickly (rate);

C) to give the students the opportunity to perform in an individual work arrangement and in a group work arrangement;

D) to compare the productivity of students on this task in the individual and group work arrangements;

E) to teach students to work for monetary payment at weekly intervals.

The entire program was divided into two parts. In Part I, one group of students was taught to complete the assembly task. Subsequently, attempts were made to increase the production rates of the students and to teach them to produce at a high rate on a weekly payment schedule.

In Part II another group of students was taught to complete the assembly task. Subsequently, these students were given the opportunity to perform in individual and assembly line work arrangements in an attempt to discern which arrangement was more productive for these students on these tasks.

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[1] Appreciation is expressed to the Madison Opportunity Center for making Wisconsin Department of Natural Resources work materials necessary to complete this program available to the Madison Public Schools.

[2] This program was supported in part by funds granted to the Madison Public Schools by the State of Wisconsin, Department of Vocational Education and in part by NICHD Grant 5 P01 HD 03352 to the University of Wisconsin Center on Mental Retardation.

METHOD

Students (Ss)

Part I

The group used in the first part of the program (Group I - Individual production) consisted of seven Ss enrolled in a public school special education class. Ss ranged in chronological age from 14 years 3 months to 18 years 9 months ($\bar{X}$=16.6) and in I.Q. scores from 48 to 71 ($\bar{X}$=62.4). According to their cumulative records these students were diagnosed as educable mentally retarded.

Part II

Several different classes were actually involved in the second part of the study. However, as the programs and results were quite similar in each class, an account of only two of the classes will be presented here. Since these groups worked both in individual and assembly work arrangements, they will be labeled Group II-A and Group II-B.

Group II-A consisted of one female and nine males. Ss ranged in age from 13 years to 20 years 10 months ($\bar{X}$=17.10), in I.Q. scores from 32 to 50 ($\bar{X}$=42.5), and were enrolled in a special education class in a public school system.

Group II-B consisted of nine males, ranging in age from 13 years 4 months to 20 years 7 months ($\bar{X}$=17.1) and in I.Q. scores from 46 to 69 ($\bar{X}$=54.9).

Cumulative records of Ss in both groups included such diagnoses as trainable mentally retarded, brain injured, emotionally disturbed, chronic brain syndrome, and Down's Syndrome. These records also contained such statements as "low verbal ability", "poor coordination", "perserveration", "low attention span", "can't follow directions", and "apathetic and unmotivated".

Materials and Work Arrangements

Part I - Individual

Each S was seated at a table in the school's pre-vocational workshop facing the following materials:

1) a stack of yellow inserts (containing information describing Wisconsin natural resources);

2) a stack of white inserts (containing information describing Wisconsin natural resources);

3) a pile of booklets (containing pictures and information about Wisconsin, compiled by the State Department of Natural Resources);

4) a pile of plastic bags for packaging the booklets. The bags were placed on the table with the window side down and with the open end of the bag toward the student (a work-space model is attached).

In the individual work task, S placed both the yellow and white inserts into the booklet, then placed the booklet in the plastic bag with the window in the bag (for address label) facing the back of the booklet.

A kitchen timer was used to measure work intervals and a data sheet was used to record the number of accurate and inaccurate booklets produced in a given session. A graph for each S was also displayed on which his total of accurately bagged booklets was recorded at the end of each session. Money was used as an incentive in Phase II of the program.

Work periods were divided into 20 minute sessions. At the end of each session, the teacher (T) counted the bagged booklets and recorded the total next to each Ss' name on the data sheet and on the graph. Each S was paid for his own production when his group worked on the individual work task.

Part II

Exactly the same materials were used in the second part of the program. However, in addition to the individual work arrangement described in Part I, an assembly line work arrangement was also utilized.

In the assembly line setting, each S was responsible for only one component of the task. Each S was seated at a table facing only one of the materials described above. The assembly line arrangement will be presented in more detail below.

In the assembly line arrangement, the groups were instructed to work as fast as they could. The total number produced at each table was added, and that total was divided by the number of Ss working. Each S in a group was paid one cent for every 5 booklets the group assembled correctly.

Teaching the Components of the Tasks

Part I

The individual work task was divided into the following components:

1) S picks up 1 yellow insert in his right hand and places it in his left hand.

2) S takes 1 white insert and places it on top of the yellow insert in his left hand.

3) S opens the booklet and places both inserts inside the booklet.

4) With the booklet in his right hand, S picks up a plastic bag with his left hand.

5) S inserts the booklet in the bag so that the open end of the booklet is at the open end of the bag and so that the window in the bag is at the back of the booklet.

6) S places each bagged booklet on a pile and cross-hatches them.

The teaching procedure consisted of 2 steps (Brown, Van Deventer and Perlmutter, 1971). First, Ss were taught to perform the task by responding to the verbal directions; then Ss were taught to perform the task without directions. In the first step of the teaching procedure, T brought S to a work station and said, "You are going to learn to do this job. Now please do exactly as I tell you to do." T then said, "Pick up 1 yellow insert with your right hand and put it in your left hand". If S responded correctly, T said, "Good" and proceeded to step 2. If S did not respond correctly, T repeated the direction while she modeled the correct behavior and repeated the direction. A priming procedure was used with Ss who did not respond correctly after the behaviors were modeled. While repeating the direction, T physically guided Ss through the correct behaviors. T then gradually removed her assistance until Ss could complete the entire series by themselves. As soon as all Ss had responded to the verbal directions correctly, T faded (i.e. gradually removed) her verbal directions until each S could perform the complete work task without directions.

Part II

The same procedure used to teach the individual components in Part I was used to teach the individual and assembly line components in Part II.

The individual work task for these groups was exactly as it was in Part I. In the assembly task, however, the verbal directions were slightly different. Since each S was responsible for only one component of the task, Ss had to be taught to move the materials in the right direction and to try to keep up with their group.

The assembly task was divided into the following components:

1) S_1 picks up a white insert and hands it to S_2.
2) S_2 takes the white insert and, putting a yellow insert on top of it, hands them to S_3.
3) S_3 takes the 2 inserts and places them inside a booklet which he then gives to S_4.
4) S_4 puts the booklet with the 2 inserts in a plastic bag.
5) S_5 puts the bagged booklets in a pile in a cross-hatched fashion.

To teach the task, at least 5 Ss were taken to a work table. Ss were instructed to do exactly what T told them to do. T then told the first S to pick up one white insert and hand it to the person next to him (holding the yellow insert). If S_1 responded correctly, T said, "Good", and proceeded to S_2 and the second task component. If S did not respond correctly, T repeated the direction and modeled the response, finally using a priming procedure if necessary. As soon as each S had responded correctly to the verbal direction, T faded her verbal directions until each S could perform any component of the task without directions.

Increasing Production Rates

When Ss demonstrated that they could perform the task correctly, attempts were made to increase the rates at which they assembled the booklets.

Part I

Phase I (Baseline) - In Phase I, each S was taken to a work station. T told him, "When I say 'Begin', you are to start bagging the booklets as fast as you can; try not to make any mistakes. At the end of 20 minutes I will tell you to stop." At the end of that time, the bagged booklets were removed from the view of Ss and counted. No feedback concerning accuracy or rate was given to any S during this phase.

Phase II (Introduction of Monetary Reinforcement at Weekly Intervals) - Group I worked on the task in an individual setting, never in an assembly line arrangement. Each S was told that at the end of 5 days (on Friday) he would be given a penny for each (1, 5, 3, 2) booklet correctly assembled during the week. The booklets were counted at the end of each session, and each S was told how much he earned that day. Inaccurately bagged booklets were delineated and the effects were explained. Initially Ss were paid one cent per booklet, but the ratio was later changed to one cent per 2, 3, and 5 booklets (lack of funds= deflated economy).

In addition to monetary reinforcement, each S's total of accurately bagged booklets was recorded on a graph at the end of each session. After the baseline rates were established, T presented each S with a graph of his baseline production rates and told, "This line tells me how many booklets you bagged in a 20 minute period. Now we will try to work faster and better. If you do, your line will go up and that is good. If you do not work better and faster, your line will go down and that is not good. When the 20 minute period is up, we will count how many you did, mark your graphs, and see how far your line went up."

Part II

Phase I (Baseline) - The procedures used to establish individual baselines in Part II were exactly the same as those used in the baseline phase of Part I. In addition, a 4-trial baseline was taken during the assembly line arrangement. In the assembly line arrangement 5 Ss were seated at each table. Ss were instructed to work in an assembly fashion as fast as they could. At the end of 20 minutes the bagged booklets from each table were removed and counted. The total was divided by the number of students working and an average number of booklets for each trial was obtained. No feedback concerning accuracy or rate was given to any S during this phase.

Phase II - During the next phase of the program, both groups (II-A and II-B) alternated between individual and assembly arrangements on the task, although not on a systematic basis. Ss from these groups always received monetary payment at the end of each 20 minute session. The booklets bagged at the end of each 20 minute session were counted in the presence of S, defects were delineated and explained. One penny was paid for every 5 accurately bagged booklets under both the individual and assembly arrangements.

RESULTS

Part I

Phase I - The number of booklets accurately assembled by each S in each of the 3 baseline trials was combined, yielding a group total of completed booklets per session. Incorrectly assembled booklets were not included in the counting. During Phase I (baseline period, sessions 1, 2, and 3), Group I produced an average of 278 booklets accurately per session (Figure I).

Phase II - Inspection of Figure I suggests that when the money contingency and charts were put into effect, the performance of Group I increased gradually until at session 37, 38, and 39, they were averaging 642.3 booklets per session, where in Phase I they were averaging only 278 booklets (Figure I).

Part II

Phase I - During Phase I (sessions 1, 2, 3, and 4), Group II-A produced an average of 111.75 booklets accurately per session in the individual arrangement, but averaged only 59.75 booklets per session over the 4 baseline sessions in the assembly arrangement (Figure II).

During Phase I (sessions 1, 2, 3, and 4), Group II-B accurately assembled an average of 223.75 booklets in the individual work arrangement, while in the assembly line arrangement, this group averaged 81 booklets over 3 baseline sessions (1, 2, and 3) (Figure III).

Phase II - During the final 4 sessions, Group II-A averaged 214.5 booklets in the individual work setting, while the average number of booklets produced in the assembly line setting for Group II-A was only 105.75 booklets (Figure II).

In the individual work arrangement, Group II-B produced an average of 380.5 booklets in the 4 final sessions. In contrast, Group II-B accurately assembled an average of only 198.67 booklets in the final 3 sessions in the assembly line arrangement (Figure III).

DISCUSSION

Figures I, II, and III clearly suggest that when money and charts were introduced as incentives the production rates of the students involved did, in fact, increase substantially. Furthermore, when production rates under the individual and assembly arrangements are compared, the students clearly produced at higher rates under the individual work arrangement.

Thus, many of the objectives of the program were approximated. First, when rates of accurate work was consequated with money, the rates increased substantially. These increases in rates were maintained on a weekly payment schedule which resembles payment conditions in community sheltered workshops. Secondly, it should be noted that in many sheltered workshops, workers are put on assembly line tasks because it is assumed that they will produce more under this arrangement than if they were allowed to complete the entire task by themselves. Such was the situation with this task in a local sheltered workshop. However, the performance of the students in the program described here clearly indicates that the arrangement in which a worker is placed should be based upon empirical verification of his production in different situations, rather than on the presumption that because he is retarded, he can do better in a simple assembly line arrangement.

Finally, it should be realized that because of the absence of adequate controls, summary statements related to implications or generalizations must be limited. The primary point to be made here is that through simulated experience within a public school prevocational workshop, retarded students can be better prepared to function in community vocational settings.

Reference

Brown, L., Van Deventer, P., and Perlmutter, L. Effects of consequences on production rates of trainable retarded and severely emotionally disturbed students in a public school workshop. Unpublished paper, 1971.

FIGURE I

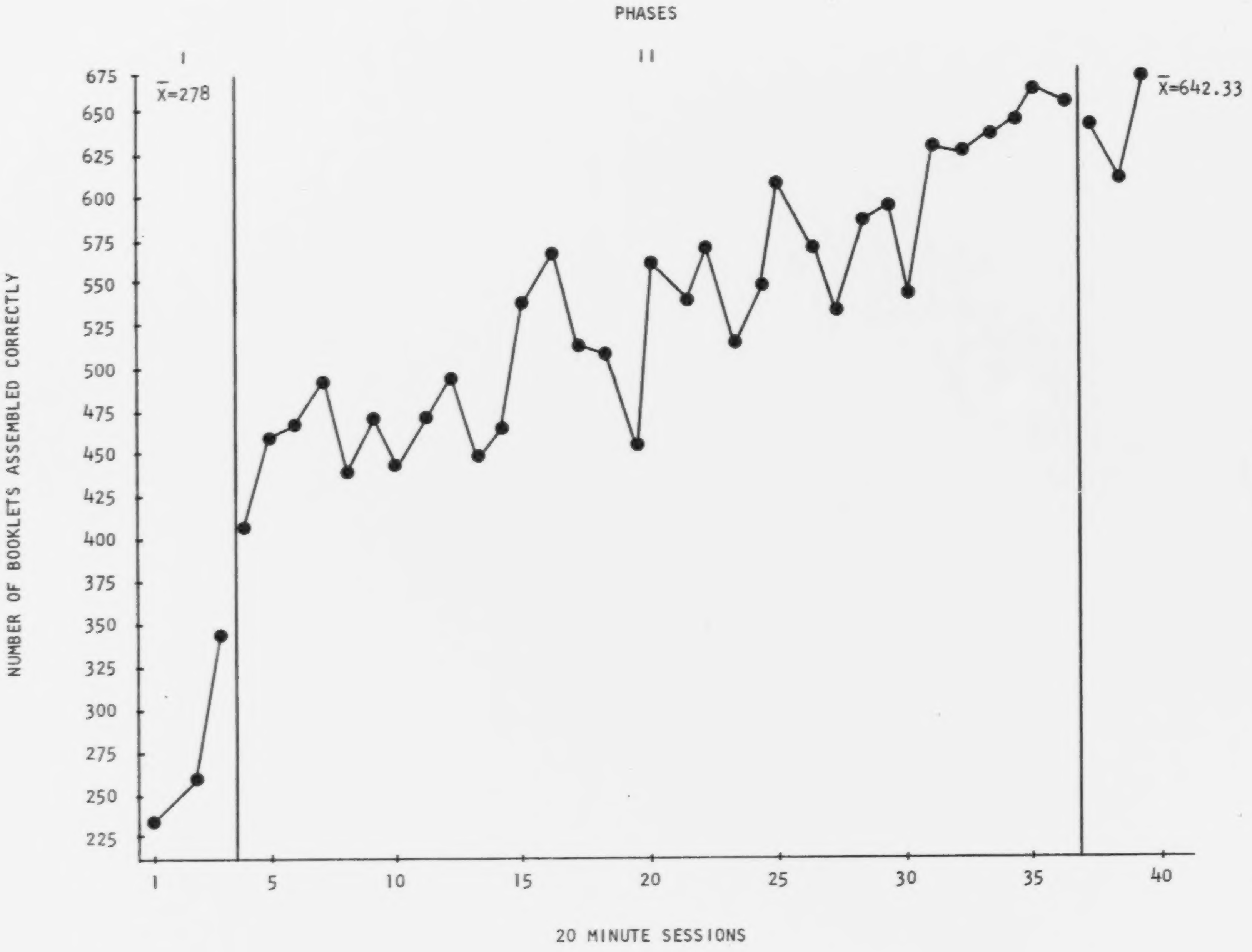

PHASES
I
II
$\bar{X}$=278
$\bar{X}$=642.33
NUMBER OF BOOKLETS ASSEMBLED CORRECTLY
675
650
625
600
575
550
525
500
475
450
425
400
375
350
325
300
275
250
225
1
5
10
15
20
25
30
35
40
20 MINUTE SESSIONS

FIGURE II - GROUP II-A

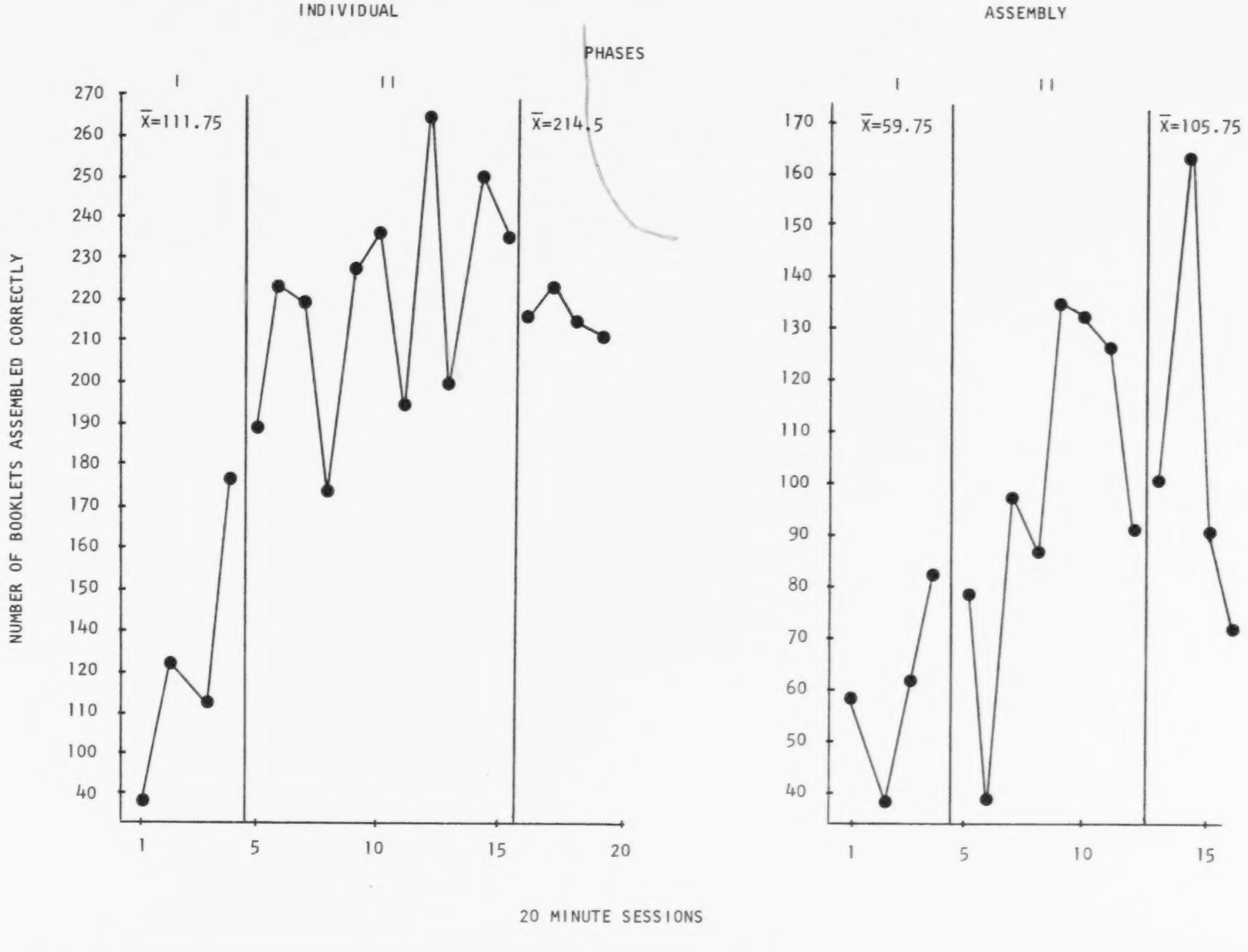
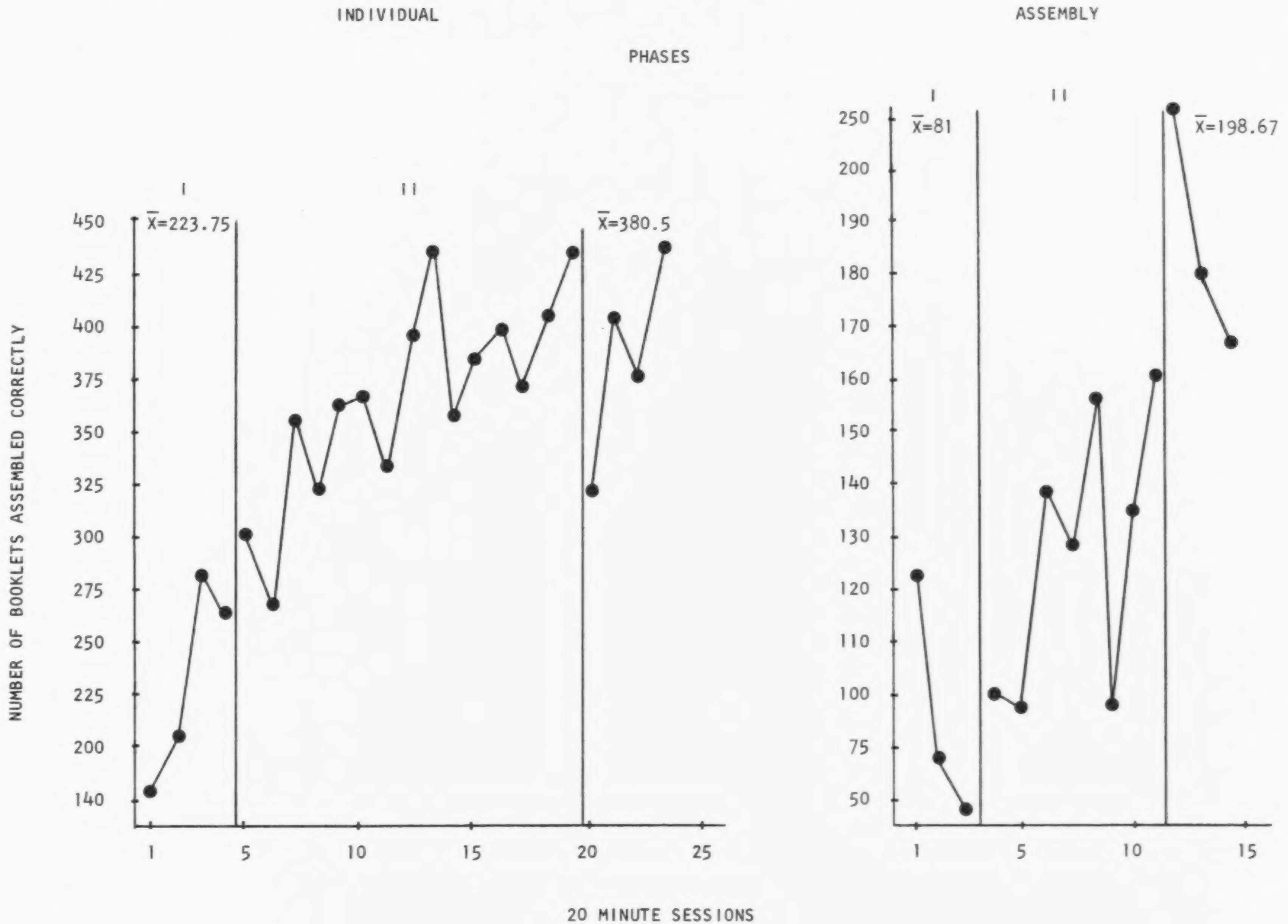


FIGURE II - GROUP II-B



Teaching Retarded Students To Package Golf Tees In The Absence Of Customary Production Supports

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The following is a report of how classroom teachers attempted to determine generalization of workshop behaviors by removing several stimuli to which students were accustomed. The students, trainable retarded and severely emoticnally disturbed, had been involved in workshop tasks during the entire school year. During previous workshop tasks, some sort of timing device which would sound, to commence and/or finish the work sessions, had been used to stimulate students to work faster. The amount of time worked each session had remained constant, usually 20 minutes, within a task. Frequent teacher praise was given to students for correct responding. Accurate, fast production had been encouraged with immediate gratification in varied forms, i.e., individual graphs, group graphs, money. Under these conditions, all production rates had shown general increases.

In order to determine any generalization effects these conditions were all removed when the new task was introduced. Several vocational skills were involved in the new task, as well as in previous tasks: A) visual discrimination; B) fine motor coordination and dexterity; C) multiple direction-following; and D) high-rate producing of quality products. These skills would remain even when the supporting stimuli were removed.

This particular new task involved the packaging and sealing of wooden golf tees in plastic bags. The project was made available to Badger School by the Madison Opportunity Center, a local workshop currently involved in this pack-

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aging, sealing process. The task was considered "seasonal" since golf tees are not in demand until late spring/early summer months (at least in Wisconsin).

METHOD

Students (Ss)

Forty-eight Ss, arranged in five different classes in a public school program for trainable retarded and severely emotionally disturbed Ss, were involved. Ss ranged in CA from 14-7 to 21-2 years ($\bar{X}$=17-9), in MA from 4-9 to 10-6 years ($\bar{X}$=7-8), in IQ from 28 to 71 ($\bar{X}$=49.5) and in years in school from 9-16 ($\bar{X}$=12.5) years.

Examination of psychiatric and educational records showed such statements as "unable to follow directions, severely retarded, extremely distractible, no attention span, lacks motor coordination, severely emotionally disturbed, poor visual discrimination, unmotivated."

Materials and Work Arrangements

Each S used the following materials for the packaging task:

1) An 8½" x 11" cardboard chute, constructed by the student teacher, from a shoe box lid. Each chute contained 11 green dots arranged in rows and numbered 1-11.

2) Colored (red, orange, yellow, dark blue, light blue, and white) wooden golf tees, 2" in length, were contained in cottage cheese cartons. A tee was to be placed on each of the 11 dots on the chute.

3) A 3" x 5" plastic bag was placed on the neck of the chute. After each green dot contained a tee, tees were deposited in the plastic bag.

4) An 8½" x 11" shoe box, labeled with S's first and last name and group number on a 3" x 5" index card stapled to one end was at each S's work area. The labeled shoe box was used to hold bags of tees.

Ss also had access to a heat sealer machine located by a side wall in the pre-vocational workshop. The heat sealer was used to seal the open edges of the plastic bags.

Work was performed at tables, seating 4 Ss each, in a public school pre-vocational workshop. The entire program was conducted by the classroom teacher (T) and a student teacher. A schematic model of the workspace is presented in the reference section of this paper.

A data sheet was constructed to record the number of bags of tees and bags sealed by each S during a work session. No specific time period was set for the task; instead, periods varied daily and between groups, from 5, 10, 15, 20, 25, to 60 minutes ($\bar{X}$=22). T checked each bag in an S's shoe box for accuracy during the work period and clipped those bags together with a paper clip.

Delayed payment was initiated during this task. Money (varying from 5¢, 10¢ or 20¢ between groups) was given only after an S had completed (bagged, sealed) 25 bags (fixed ratio-25).

Teaching the Components of the Task

The packaging and sealing included the following 7 steps:

1) S places a plastic bag on the neck of the chute.
2) S places one golf tee on each of the 11 green dots on the chute.
3) S holds the chute upright with one hand and holds the plastic bag on the neck with the other hand, to slide the 11 golf tees into the bag.
4) S removes the plastic bag from the neck of the chute.
5) S places the bag upright in his shoe box.
6) After T reports that S has 25 bags of tees, S goes to the heat sealer machine.
7) S feeds the open edges of a bag into the jaws of the machine and depresses the foot pedal to seal the bag.

During the teaching procedure T gave each S all necessary materials and said, "Your new job is to package golf tees. Now, please watch me and do exactly as I do." T modeled each of the first 6 steps sequentially for the group and requested that Ss imitate her immediately after demonstration. If an S did not seem to be working, T repeated her directions for him and modeled the correct procedures. A priming procedure was used for students who did not work after repeated modeling.

T then told Ss, "When I see that you have 25 bags of golf tees in your shoe box, I will show you how to seal the open edges of the bags on the heat sealer machine. When you have sealed all 25 bags, you will be paid ___ (5, 10, or 20) cents. I will not be timing you on this new job, so begin working when you are ready."

Throughout the work sessions, T checked the bags in each S's shoebox for accuracy and recorded the number of bags. If she counted 25 bags of golf tees in a S's shoe box, T reported it to S and took him to the heat sealer to demonstrate step 7. T closed a work session by saying, "You may now finish the bag you are doing and then put all of your materials away." T then checked and recorded any bags which had not been previously checked during the work session. T reported the number of bags completed to each S.

RESULTS

The production rates of all Ss showed general increases, with no significant decreases during the 8 work sessions in which each group participated.

Due to the seasonal nature of the task and onset of summer vacation, it was impossible to hold more than eight work sessions for each group. The production rates of 3 Ss will be presented in Figure 1 as representative of the low, medium and high levels of production which emerged. During the 8 work sessions ($\bar{X}$=22 minutes), these Ss produced an average of 4, 9, and 19 bags of tees. Thirty-nine of the 48 Ss received monetary payment at least once following the sealing of 25 bags. The total number of correct golf tee packages produced and returned to the sheltered workshop amounted to over 1,700 by the end of the school year.

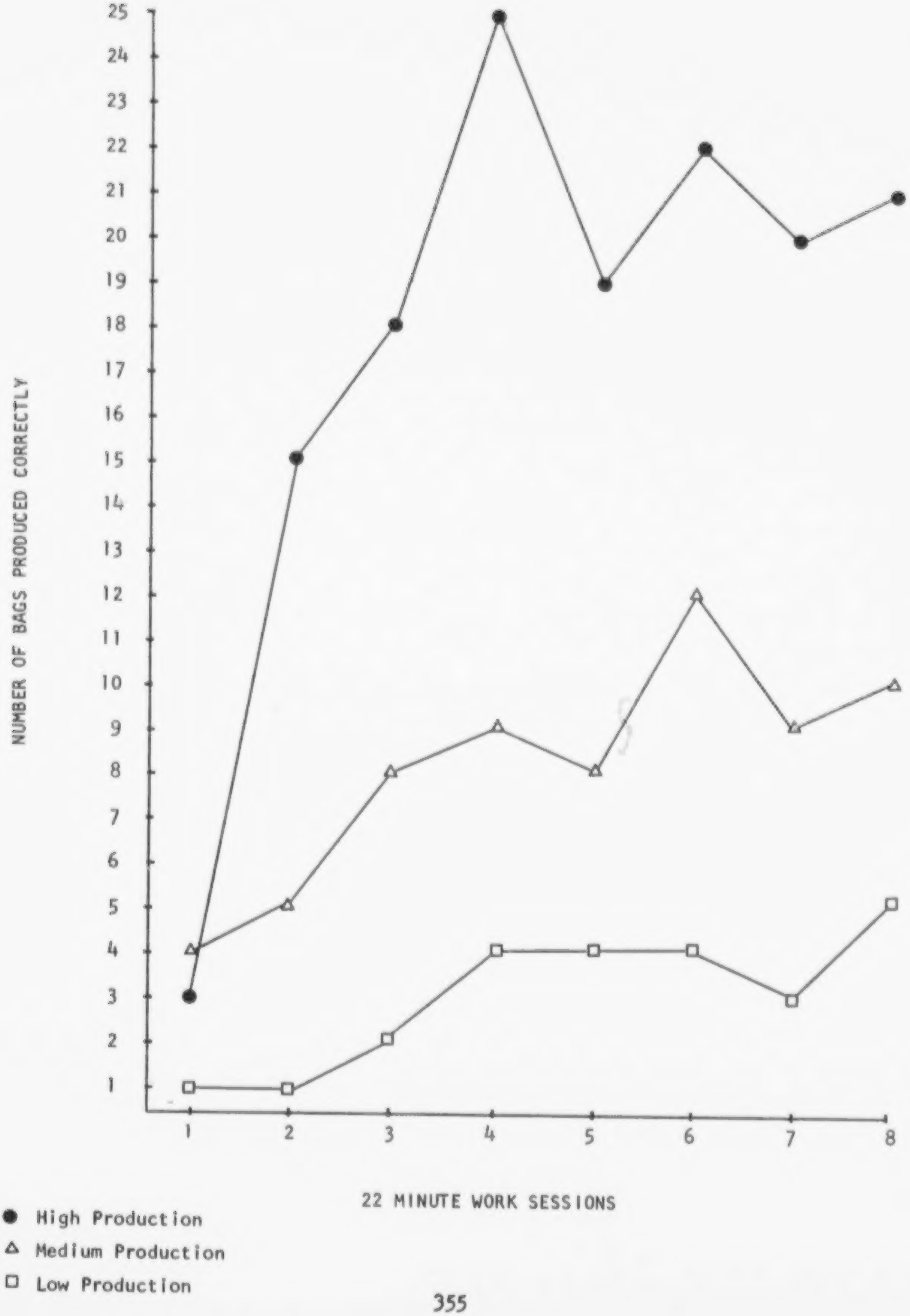
DISCUSSION

The primary objective of this project was to determine generalization of workshop behaviors with the removal of supportive stimuli to which the students were accustomed, i.e., timer, specific time limit, immediate payment and frequent verbal praise from the teacher. All students did, in fact, increase their production rates under the new arranged conditions. However, the number of work sessions was not great enough to determine if students production rates would have continued to increase.

The increase in all production rates cannot be attributed to one specific variable. Many variables were operating during the project, i.e., newness of the task, practice, teacher feedback, teacher proximity, peer reinforcement. No attempt was made to discern which of these variables were effective. Increases in individual production rates may have been due to one or a combination of variables. In addition, variables that accounted for one student's increase may not have accounted for another's. Students were overheard when making statements such as "My box is fuller than yours" and "I'll get to the heat sealer before you will." Some students even vocalized a starting and stopping point to themselves by saying, "Begin!" or "Stop!" after the teacher gave her directions.

This report implies that after behaviors, such as workshop skills, are well established through repeated utilization with supportive stimuli, those stimuli may eventually be removed without the diminishing of appropriate behaviors. If trainable retarded and severely emotionally disturbed students will be expected to function effectively in a future vocational setting, such as a sheltered workshop, they will have to function without many of the additional stimuli which may be utilized to initially increase production rates in public school pre-vocational programs. These students will be expected to produce quality products at relatively high rates without being told when to stop and start, without frequent praise from a supervisor, for time periods extending to 40 hours a week, and with payment accruing only once a week. From this project, it would be hazardous to imply that generalization of the workshop behaviors of the students involved would extend to a 40 hour per week situation in a sheltered workshop. Nevertheless, it appears that at least some rudimentary manifestations of generalization were manifested.

FIGURE I



NUMBER OF BAGS PRODUCED CORRECTLY
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
1
2
3
4
5
6
7
8
22 MINUTE WORK SESSIONS
● High Production
△ Medium Production
□ Low Production

Workspace Model

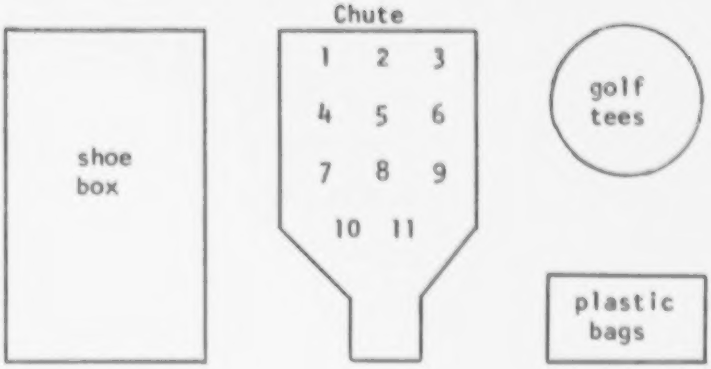

Chute
1
2
3
4
5
6
7
8
9
10
11
shoe box
golf tees
plastic bags

Figure I - Number of bags produced in average 22 minute work sessions.